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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

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Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timley tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: **Editor, IFM Newsletter, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.**

This issue features a continuation of our article entitled "Alternative Income Opportunities From Private Woodlands".

SHIITAKE MUSHROOM PRODUCTION: GOOD FOOD COMBINES GOOD FORESTRY AND GOOD ECONOMICS

Many new woodland management opportunities are emerging as landowners and foresters look beyond conventional sawtimber production. Among the most exciting new practices are a series of techniques for cultivating edible mushrooms on wood that has little or no value for lumber. Techniques for growing several species of mushrooms on various kinds of wood and wood wastes have recently been developed, but the most success to date has been with the shiitake (pronounced she-e-tah-kay) mushroom. This article will introduce you to the fundamentals of shiitake cultivation and explain the economic and environmental protentials of the delicious mushroom.

What Are Shiitake Mushrooms?

Shiitake are highly prized edible mushrooms that are native to eastern Asia. They are also known as Chinese black mushrooms, and they are a key ingredient in many Oriental dishes. Dried shiitake from Japan have been available in health food stores for many years, but fresh, domestically-grown shiitake are now appearing in many supermarkets. Shiitake are good food not only because they are a good source of protein and some vitamins, but also because of their medicinal value. Studies indicate that shiitake have strong antitumor and antiviral properties, lower serum cholesterol and stimulate the immune system. Shiitake are best known, howerver, for their excellent taste and appealing texture. In Japan, where shiitake cultivation originated, shiitake cost twice as much as common button mushrooms, but outsell them manyfold.

How Are Shiitake Grown?

Shiitake production has six basic steps: (1) Acquisition of shiitake spawn, (2) Acquisition of suitable logs, (3) Inoculation of logs with spawn, (4) Incubation of inoculated logs, (5) Mushroom fruiting, and (6) Harvest, storage and marketing of the mushroom crop.

(1) Acquisition of shiitake spawn. Shiitake is propagated vegetatively by "spawn", not by spores. Spawn comes either as wooden plugs or as sawdust in which the threadlike microscopic body of the fungus is actively growing. Many strains of

shiitake are available and they can be classified as cool-season fruiters, warm-season fruiters, or wide-range fruiters depending on when they typically produce mushrooms. Some growers with training in microbiology keep their own pure cultures of shiitake spawn going from year to year, but most people buy new spawn for each batch of logs they inoculated. A list of companies that sell spawn and other shiitake supplies can be obtained by writing the newsletter editor.

(2) Acquisition of suitable logs. The ideal logs for shiitake cultivation are freshly cut, 4-6 inch diameter, 3-foot long oak (any species). Other species may be suitable for shiitake cultivation, but beginners should stick with oak. Logs should be cut in late winter or early spring before the buds start to swell. Logs cut too soon tend to dry out and become infected with other wood decaying organisms. Smaller and larger diameter logs can be used, but smaller logs tend to dry out too quickly and larger logs are difficult to handle. Logs should be kept as clean as possible and those with decay in them should not be used.

(3) Inoculation of logs with spawn. Inoculation is a 3-step process. First, holes about 3/8 inch in diameter and 1 inch deep are drilled in the log 6-12 inches apart in lengthwise rows, with rows about 1 inch apart around the circumference. This results in about fifty holes in a 5 inch diameter log. Second, spawn is immediately placed in the holes by hand or with a special tool if sawdust spawn is being used. Care must be taken not to expose the spawn to sunlight or let it become dry. Third, hot wax (paraffin or cheese wax) is immediately dripped over the spawn in the holes to seal in moisture and seal out contaminants.

(4) Incubation of inoculated logs. Before logs will produce mushrooms, the shiitake fungus must completely colonize the log. This takes from six months to a couple of years, depending on the strain, the incoculation rate, and the incubation conditions. Incubation, or "laying", is generally divided into two phases, and many log stacking patterns can be used during each of these phases. In primary incubation, which consists of the first two months following inoculation, logs are usually stacked quite closely to help maintain a high log moisture content that will favor shiitake growth. In secondary incubation, which consists of all subsequent non-fruiting periods, logs are usually stacked more loosely to allow mushrooms to emerge and to be harvested. In both incubation periods, the logs must be kept well shaded and protected from drying winds. To maintain proper log moisture content the logs may need to be restacked more closely, covered with permeable cloth, or even sprinkled. However, the surfaces of the logs should not be allowed to remain moist for long as this will favor contanination. To monitor log moisture content, several logs of known dry weight should be included in the laying yard and occasionally weighed to calculate their moisture content.

(5) Mushroom fruiting. After an adequate incubation period, mushroom fruiting is triggered by natural rainfall or it can be stimulated by soaking the logs in cool water for one to two days. Mushrooms then appear and grow to mature size within a few days. The best quality shiitake form when the weather during expansion of the mushrooms is cool and dry. Once logs begin to fruit, they will produce mushrooms one to several times per year for about three to six years without being re-inoculated.

(6) Harvest, storage and marketing of the mushroom crop. After rainfall or soaking, the logs should be checked daily so that the mushrooms may be harvested at peak condition - with caps about 1/3 to 2/3 open. Harvesting is done by hand and is best done in the afternoon when the mushrooms are dry. Like other mushrooms, shiitake should be kept refrigerated in paper or breathable plastic. The shelf-life of shiitake is about twice that of the common button mushrooms, so they may be kept for several weeks if properly stored. Marketing options vary with locale, but consumer interest in shiitake is rapidly growing, and farmer's markets, restaurants, food coops, and supermarkets are all good outlets. Shiitake dry easily and reconstitute very well, so marketing by mail is also possible. For most growers, direct, local marketing is probably the best choice, but many clientele's will require some education about the qualities of shiitake.

How Can Logs For Shiitake Production Be Obtained or Produced?

Because shiitake are best grown on small diameter logs, this affords a woodland owner an excellent opportunity to utilize trees that are thinned during timber stand improvement (TSI) work and from the tops of trees recently harvested for sawlogs. Thus, the production of shiitake logs can be integreated in to, and improve the profitability of, conventional timber management practices. Because conventional timber management proctices usuallly must take place on several acres at once to be economical, a lanowner would need a large acreage of timber to produce a sustained annual yield of shiitake logs.

EDITOR'S NOTE: Extension specialists in the Lake States report that some landowners growing shiitake mushrooms are harvesting their best young, pole-sized red oak stands for the the logs because the stems are straight and easy to work with. This type of practice, if expanded, can seriously affect the quality and supply of hardwood in the future. A forester should be consulted before trees are removed from your woodland.

A good alternative for Midwestern landowners with typically small woodland acreages or marginal agriculture land who want to develop ongoing shiitake operations would be to produce logs by coppicing or pollarding. In coppicing, trees would be cut off at ground level on a rotation of about 20 years and allowed to grow back from the stump sprouts. Pollarding is like coppicing, but the trees are cut off far enough above the ground to keep livestock and wildlife from browsing the tender sprouts. By dividing your woodland acreage or acreage planted to oak seedlings (e.g. 10 acres) by the rotation length (e.g. 20 years), you get the number of acres per year that you can harvest on a sustained basis - in this example 1/2- acre per year. A 1/2-acre timber sale is usually not practical, but a 1/2-acre harvest of shiitake logs every year makes good sense.

Can Shiitake Production Pay Its Way?

Yes, some landowners and corporations are already doing a good business. However, shiitake production is a new enterprise so the assumptions behind economic projections are less certain than those used to predict the profitability of well-established practices. Although market prices for shiitake are currently quite high ($6-8 or more per fresh pound), how soon and how far down prices will go is uncertain. On the

production side, shiitake cultivation in the U.S. is so new that very few yield studies have yet been completed here. Nevertheless, most attempts to analyze the economics of shiitake production to date are optimistic about the potential profits. Beyond optimistic predictions of net profit, shiitake is an attractive alternative because the initial costs are very low compared to most other food production enterprises. Many landowners already have most of the equipment needed to get started and costs for materials are minimal (about $1 per log, excluding the log itself). Like all promising but untested alternatives, it is wise to start experimenting as soon as possible, but on a small scale.

More Information.

More printed information on shiitake production, including a bibliography of publications, can be obtained by writing the Editor of the newsletter. Please enclose $2.00 (checks payable to Dept. of Forestry) to cover printing and mailing costs.

Prepared By: Dr. Christopher Burnett, Assistant Wildlife Ecologist, Illinois Natural History Survey, Champaign.

SilvaScene

YOUR WOODLAND'S SITE QUALITY - WHY IS IT IMPORTANT?

What makes your neighbor's woodland better than yours, or yours better than the woodland of other owners in the area? The most obvious answer is the land it's growing on, however, the management your neighbor gives his or her woodland may be superior to yours, too. But for the sake of argument, let's assume that neither of you are doing any woodland management (that's a safe assumption since only a small percentage of Illinois woodland owners practice good woodland management on their property). Rainfall can also be ignored since over the woodland's lifetime one assumes that both woodlands receive an equal amount of rain.

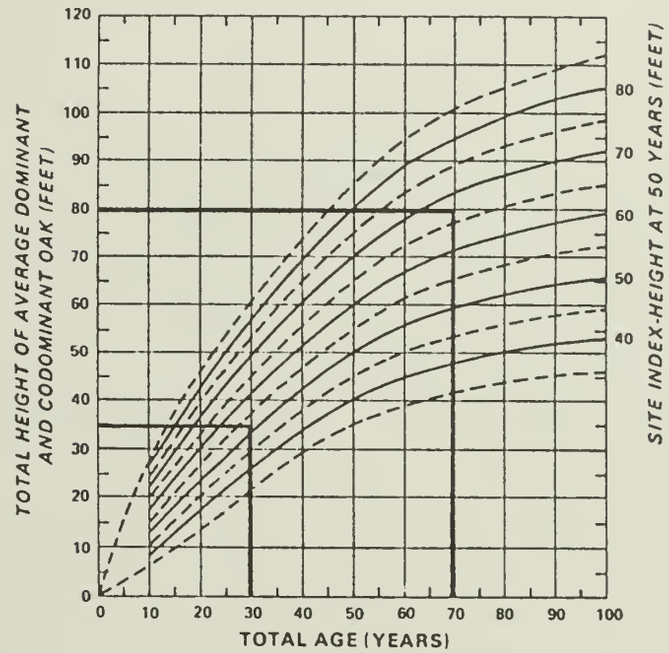
If a forester has visited your woodland or you've attended field tours led by a forester, you may have heard statements similar to this made..."this is a good site for growing upland hardwoods", or "this site is better suited to bottomland species." The forester uses the term "site" as an expression of the land's capability to grow woody vegetation; in most cases timber. In his or her discussion, the term site index may have been used. Woodlands are quite varied in the volume of timber they can produce, just as are agricultural fields. Your woodland may be made up of many different smaller sites as well. A quick walk through your woodland observing the change in species and their relative size (assuming there has been no recent harvesting activity) will give you a hint about good and poor growing sites.

Soil type is an important factor in determining the site's suitability for tree growth, especially where no trees currently exist. For new tree plantings on abandoned agricultural land, this may be the only information on which to base an assessment. In Illinois, extensive soil surveys have been done and include detailed information about soil characteristics important to tree growth and development, such as structure, horizon thickness, texture, soil moisture availability,

position of the water table, or impenetrable hardpan formations. A general guide to the productivity of Illinois soil types for agricultural crops and timber (both hardwoods and conifers) is given in **Circular 1156**, Soil Productivity in Illinois (cost $1.25) available from the University of Illinois Cooperative Extension Service. Detailed information about soil-site relationships can be obtained from your county Soil Conservation Service office or Department of Conservation District Forester.

Soil characteristics are important to foresters in assessing site quality, however, one indicator commonly used is the height growth of dominant and co-dominant trees in the woodland canopy. Extensive studies have shown that height growth of trees in the upper canopy is very sensitive to changes in site quality. Better sites will produce trees of greater height. Site quality does not have a strong influence on the diameter growth of trees. Diameter growth is influenced more by the availability of growing space, or by competition from nearby trees. In a dense woodland where trees are crowded most tend to be tall and spindly reaching for the sunlight in order to survive.

Site index values are based on the total height and age of the dominant trees in the woodland. For central hardwoods, a 50-year base is used. Site index is expressed as a number. A range of numbers is known as a site class. A site index of 55 means that the dominant trees will average 55 feet in height at 50 years of age. Age is determined by using an increment borer which extracts a small wood core from the trunk thus exposing the annual rings. Site index curves have been developed for most species in the central hardwood region (Figure 1). This enables foresters to compare the growth potential of two sites for a particular species, such as red or white oak. Assuming the base age is the same, the larger the site index number, the better the site quality. Refer to Figure 1 for the following example.



Site index curves for upland oak (Schnur 1937).

Figure 1.

Suppose the total average height of the dominant trees in an upland oak stand was 80 feet and their age was determined to be 70 years. These measurements indicate a site index of 67. A younger oak woodland nearby has 30 year old dominant trees that measure 35 feet in height. The site index for this woodland is 52. Therefore, the first woodland is a better site for growing oaks. Generally for oak production, a site with an index of 75+ is classified as good, while an index of 55-74 is average, and an

index below 55 is considered poor. Red oak predominates on good sites and does not reproduce or grow well on poor sites. White oak will tolerate a broader range of site qualities, but produces the best timber on medium to good sites. On good sites managing strictly for oak may be difficult since the productivity of the soil favors the regeneration of a larger number of tree species as well as more rigourous growth of weedy undergrowth that competes with desirable oak species. On average sites, oak management should be less difficult provided measures are taken to ensure that adequate oak reproduction is present in the woodland prior to harvest. Poor sites will be occupied predominately by species such as black, post, blackjack, and shingle oak (Sander, 1977).

So, what does this discussion have to do with the importance of knowing the site quality of your woodland? Obviously, not all woodlands are created equal, and therefore, what you would like to accomplish in your woodland may be limited by the site. There are ways of improving site quality, such as fertilization or tile draining wet areas to lower the water table, but these can be costly and should be weighed against the expected gain in timber value. Woodland values are probably quite different, too. Your woodland may have been in familiy as long as you can remember, but in Illinois that's a rare occurrence. On the average, woodland ownership changes every 25-30 years. If you're considering a sale of your property, it would pay to have a professional forester look at your woodland and make a qualified appraisal of its value. Remember, the value is contained not only in the timber that is currently growing on the property, but in the productive potential of the land to produce future crops of timber. If your woodland has excellent potential for growing high quality timber, it should be worth more than the average price you hear quoted for many timber property sales. Contact the Illinois Consulting Foresters Association, 2612 S. Glenwood, Springfield, IL 62704 for the name of a consulting forester in your area who can make this appraisal for you.

(Sources: Sanders, Ivan. Oaks in the North Central States. GTR NC-37; USDA Forest Service, 1977. Roach, B.A. and S.F. Gingrich. Even-aged Silviculture for Upland Central Hardwoods. Ag Handbook 355; USDA Forest Service, 1968.***

WOOD 'N NICKELS

WOOD 'n NICKELS features articles related to the economics of owning a woodlot. This issue features an article by Joe Garvey and Edward Brown, Missouri Conservation Department foresters, entitled "Rx for a Successful Timber Sale." The article appeared in the August, 1988 issue of Missouri Conservationist and is reprinted with permission. References will be made throughout the article to Missouri, but same information applies to Illinois. We will reference any specific differences in a short paragraph at the end of the article.

Rx FOR A SUCCESSFUL TIMBER SALE

A timber sale has the potential of being an agonizing or rewarding experience for a landowner. While a bad experience makes a good teacher,

it also can dampen enthusiasm for future forest management. Because many timber sales are conducted without either buyer or seller consulting a professional forester, it may help to discuss some guidelines to assist forest landowners in setting up a successful timber sale.

All too often the parties to a timber sale fail to specify their goals. It is vital for the owner to formulate a clear idea of exactly what he wants to accomplish with a timber harvest. Once the goals are listed, a logging plan can be developed, building communication into every stage so both seller and buyer have a clear picture of the outcome.

Determine Need For Harvest.

The first step in making a logging plan is to identify which, if any, trees need cutting. Waiting until trees are mature for harvesting is not always desirable. Young stands require thinning. Harvests in middle-aged stands cure past abuses and help prepare for future cuttings. Harvesting prematurely reduces the return because of unrealized growth, but deferring harvests in some stands results in slow growth and increased mortality which also reduces income. Any intermediate harvest should improve both growth and quality.

If the owner's goal were not thought out before, they should be considered now. How and what is sold is influenced by those objectives. Is wildlife improvement more important than commercial returns? If so, modify the logging plan to ensure diverse habitat after the harvest is completed. Are portions of the woodlot on steep slopes, lake watersheds or stream borders? If these considerations are important, write in protective provisions and resolve timber, wildlife and aesthetic goals before cutting.

Which Trees Are For Sale?

The wrong trees get harvested when the logger and landowner haven't agreed on which to take and which to leave.

Trees are generally designated for cutting by one of two methods. The most common method - and the least desirable from a management standpoint - is the **diameter limit**. This refers to tree stem diameter at stump height (measured a foot above the ground). All trees larger than the specified stump diameter are harvested. Many loggers prefer a small diameter limit (12-16 inches), which allows more flexibility and efficiency by providing more harvestable timber in a single woodlot. But a tree that is 16 inches at stump height, due to natural taper from butt to crown, is only 13-14 inches DBH (diameter at breast height - 4.5 feet above ground). That's usually an immature tree, which represents future timber and wildlife values on most sites in Missouri.

While diameter limit sales are easy to administer, they commonly result in overcutting or undercutting. They do not consider the seller's multiple goals or objectives very well. Diameter cuts also harvest vigorous crop trees that represent future value growth, and retain poor quality trees below the specified diameter limit. This method cuts the best and leaves the rest.

Another way to select trees for harvest is by marking with paint. This is more time consuming, but it is the best management system to use to incorporate all the owner's goals and concerns. Trees are marked with

a highly visible paint at eye level and at ground level. Possible misunderstandings between logger and landowner are thus eliminated.

Timber is sold by volume expressed in board feet. A board foot is a 12-inch by 12-inch board, one-inch thick. To sell timber and receive a fair price, a landowner must know how many board feet he has to sell. This figure is usually expressed in thousand board feet amounts, and may be further defined by stating the volume that might be available for the different products that are found in any woodlot such as pallet logs, stave bolts (logs), grade or veneer logs.

Volume figures are acquired by measuring each tree as it is marked. In the case of diameter limit sales, each tree above the limit must be measured.

The next step involves a trip to a nearby sawmill. Prices quoted at a mill usually reflect prices paid for logs delivered to the mill. The landowner's share is called stumpage which is the mill price less the logger's costs and profit.

Stumpage varies considerably - market location, logging difficulty, logger competition, economic conditions, log quality and contract restrictions all play a role in what is paid for standing timber or stumpage. One owner cannot accurately compare his stumpage to his neighbor's anymore than he can compare apples and oranges. There are simply too many variables.

While at the mill, the landowner might ask the mill owner for a list of loggers or buyers. If the mill owner does his own logging, he is also a prospective buyer.

Last, the existence and accuracy of boundary lines or fences should be determined. Neighbors next to sale areas should be consulted to be certain any questionable lines are satisfactory. In this day of civil lawsuits, it is better to be safe than sued.

Bidding.

To get the best price for his trees, the owner needs to ask for bids. These can be written and mailed to prospective buyers - or simple verbal offers from interested buyers. The amount and quality of trees for sale determines the best route to take on acquiring bids.

A written bid request packet should include a fact sheet listing the following:

** Owner's name and address.
** Location of woodlot
** Amount or volume of timber for sale.
** How trees are marked.
** Deadline for bidding.

It also includes the type of bid the seller desires, a lump sum or share bid.

A lump sum offer is simply the total value the logger is willing to pay in advance for all the designated trees. Payment is made when both parties sign a contract.

A share bid is an amount offered per thousand board feet, or in some cases a percentage of the mill delivered price. With share bids the mill does the measuring and furnishes the logger with volume tickets along with the payment. The logger then sends copies of the volume tickets along with a check to the seller on a periodic basis as spelled out in the contract.

Prospective bidders normally are give three to four weeks to view the timber for sale. Bids, unless

otherwise stated, should remain confidential.

The bid packet also contains a rough sketch or map of the timber for sale. This map includes a legal description of the property (from deed or tax bill) with sufficient road detail to permit a prospective buyer to locate the woodlot.

The third item of a formal bid packet is a sample of the timber sale contract. Potential buyers must know of any special provisions before making an offer. The type of restrictions placed on the logging operation will affect the bid price. Standard timber sale contracts are available from most Department forestry offices.

If possible, the landowner should show his woodlot to each potential buyer. Because communication is vital to a good timber sale, this is a good place to start. A personal meeting will help in selecting the best buyer. The highest bidder may not be the most dependable, so personal judgement is crucial.

Timber is worth what the highest bidder is willing to pay to get it. The more bids that are obtained, the greater the likelihood of obtaining a fair price. Timber bids will vary considerably. Different loggers have different costs, markets and methods of estimating timber.

Remember, too, that timber tax laws changed considerably in 1986, and can have an important bearing on how you sell your timber and treat management and administrative expenses. Be sure to consult a tax expert before preparing bids.

Contracting.

A written timber sale contract is a must for any landowner selling his trees. While not an ironclad agreement, the timber sale contract is the best insurance policy available to both buyer and seller. It doesn't need to cover every eventuality, but should be comprehensible, performable and enforceable by both parties.

Some items to include in a timber sale agreement are:

1. Trees for harvest: stipulate which trees are available. For example, "All trees marked twice with yellow paint are available for harvest." Or, for diameter limit sales, "All trees over 16 inches on the stump (measured 12 inches above ground on high side) are available for harvest."

2. Payment: lump sum or share. Spell out in the contract the payment method; if by shares, when or how often payments are to be made. If by lump sum, then payable upon contract signing.

3. Skidding, Loading and Hauling: permit work in weather that will not cause excessive rutting. Minor rutting will occur and should not cause disagreements. The contract should spell out that all roads and trails must be maintained near the pre-harvest condition and loading sites bladed smooth with logging debris pushed to the side. This will permit establishment of wildlife food plots. For this reason log loading sites are best pre-selected and agreed to by both seller and buyer prior to contract signing.

4. Termination date: a deadline for completion, agreeable to both parties.

5. Miscellaneous: There are other items to consider. The logger should dipose of all trash brought onto the seller's property by the buyer and his employees. Require

that all tops from cut trees be pulled into the woods line from open fields that are cropped or pastured. The contract should require that tree tops be removed from stream beds. If permanent streams are crossed by the logger, designate one or two specific crossing sites. Or, if a diameter limit is used to designate trees for sale, specify a buffer area on both sides of permanent streams where no trees are cut. Require the logger to spare good wildlife den trees. Again, communication is the common thread in successful timber sales.

Another important provision is liability. While most timber sale situations do not create additional liability for the owner, it is best to disclaim it anyway. Be certain to include equipment damage as well as personal injury in a disclaimer.

Standard contract forms contain additional provisions for such items as care in use of fires, repair of broken fences, etc. If a standard form is not used, then these items should be included as well.

A contract should protect both the landowner and the logger. The more restraints placed on the logger, the less he can pay for standing timber. Timber harvests should provide both seller and buyer a reasonable profit.

Supervision.

Logging is a tough, competitive business. When checking a sale's progress, look at the overall condition - beyond the superficial mess that accompanies even a good operation. Inspect for signs of consistent carelessness, not minor mistakes. While that sounds contradictory, there are tell-tale signs of a sloppy operator:

1. Numerous crop trees bent or broken (destroyed) by falling of marked trees.

2. Numerous crop trees overrun or scraped by the skidder.

3. Deep ruts, especially on slopes caused by skidding in wet weather.

4. Sloppy haul roads with numerous mud holes.

5. Trash lying around.

6. Warming fires in hazardous places.

7. Unmarked trees cut.

In theory, the logger is responsible for conducting his operation in accordance with the spirit and letter of the contract. In reality, a landowner should monitor the logging operation closely to ensure compliance with his objectives. But he must be careful not to take over. Supervising a timber sale is like being a good football coach. If the landowner shows a genuine concern, chances are the logger will too.

The easiest, most direct path to a successful timber sale is to contact your local Conservation Department forester.

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EDITOR'S NOTE: We'd like to comment on a couple points raised by Garvey and Brown in their article. First, verbal contracts are frequently used, but we do not recommend them. Always have a written contract so both parties have documented evidence as to what was agreed upon. Second, we recommend only lump sum

sales. The seller should receive all of his money at the time the contract is signed. Share bid or selling by scale relies on a third party to determine the volume of timber hauled to the mill. On occasion, not all the logs make it to the mill. Third, we must remind you that any landowner who sells timber in Illinois is required by state law to pay a harvest fee to the Department of Conservation which amounts to 4 percent of the total contact price for the timber. The timber buyer is responsible for collecting this fee and sending it to the DOC in Springfield. Official report forms are provided and timber can only be sold legally to timber buyers who are licensed in Illinois. And finally, we suggest you employ a professional forester to administer the complete timber sale on your behalf. A trained professional, who knows the markets, can get the best price for your timber. For more information on hiring a professional forestry consultant contact: Illinois Counsulting Foresters Association, 2612 S. Glenwood, Springfield, IL 62704, or your local Department of Conservation district forester. If you don't know who that is, write to: State Forester, Division of Forest Resources, Department of Conservation, Lincoln Tower Plaza, 524 S. Second, Springfield, IL 62706.

TRACKS features related articles and timely tips on small game and nongame management for woodland owners. If you have a particular question you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

ATTRACTING CAVITY-NESTING BIRDS TO YOUR WOODLAND.

The advantage of owning a woodlot is that with a little care it can produce many desirable things for you - shade, firewood, spring flowers, timber, solitude, and animals-including birds.

Many of the birds that like forests do so because holes in trees offer them nesting places in summer, shelter in winter, and food. In fact, about 45 different species of cavity-nesting birds live in the forest of eastern North America. Ten representative birds, their size, habitats, and the size trees or boxes they use are shown in Table 1.

Insect Eaters.

The surface of trees in which these birds feed provides all sort of nooks and crannies for spiders, ants, moths, and other small creatures. And as a tree dies, it is invaded by still other kinds of insects like bark beetles, carpenter ants, and termites. So it's natural that most hole-nesting birds eat insects; some may even help to control insect outbreaks that sometimes damage timber trees.

Many Potential Homes.

Normally there are more than enough dead and dying trees in an undisturbed forest to shelter a good population of hole-nesters. In fact, about 90 percent of the trees in a 20-year old upland hardwood stand will die in the next 60 years, and many of these will provide holes for birds. Virtually all will provide feeding areas for birds and other animals. Even if your prime objective is growing timber, you can attract cavity-nesters if you leave some dead and dying trees for them.

Table 1

TEN HOLE-NESTERS OF EASTERN WOODLOTS

Species	Length	Excavator	Secondary user	Optimum diameter for snag	Hole diameter	Box Size Length	Box Size Width	Box Size Height	Height above ground	Habitat
	Inches			Inches	Inches		Inches		Feet	
Pleated Woodpecker	15	X		20	4	--	--	--	--	Old growth; large trees; extensive forests
Screech owl	8		X	12	3	8	8	12	10-30	Open forest; meadow edges; orchards
Common Flicker	10	X		12	2 3/4	7	7	16	6-20	Large trees; open woodlands; forest edges; farm yards
Red-bellied Woodpecker	8	X		12	2 1/4	--	--	--	--	Forest interior; wooded suburbs to a lesser extent
Red-headed Woodpecker	7	X		20	2	6	6	12	6-20	Forest edges, particularly where snags are abundant
Great Crested Flycatcher	7		X	12	2	6	6	10	6-20	Forest interior; edges to a lesser extent
Eastern Bluebird	5		X	8	1 1/2	5	5	8	5-10	Forest-field edge or savanna-like habitats
Downy Woodpecker	6	X		12	1 1/4	4	4	10	6-20	Dense young forests
Tufted Titmouse	5		X	12	1 1/4	4	4	10	6-20	Deciduous forests; suburbia
Black-capped and Carolina Chickadee	4		X	4	1 1/4	4	4	10	6-20	Almost any kind of forest

Culls and Snags are for the Birds.

Generally, the bigger the snag (standing dead tree), the greater its value to birds. Large snags provide more area for excavating and feeding, often providing holes for several species. The best ones - large old den trees - are often over 100 years old, rotten in the center, with sound sapwood on the outside, and a few limbs or live branches still hanging on. Also high in demand are living trees with holes, because they are particularly resistant to predators and weather.

There are several ways to tell if a snag might have potential nest sites. Look for rotting branch stubs, conks or fruiting bodies of fungi, and old wounds and scars. All indicate that cavities probably exist. If woodpecker holes are already present, other sites are probably suitable for holes, too.

Woodpeckers do the heavy construction for most cavity nesters. They drill or hollow out space for nesting and roosting. The rest of the cavity nesters move into surplus holes made by woodpeckers, or into holes made by the natural processes of decay, insects, fire, or breakage.

Steps to Take.

1. Save old, large trees, especially those with old wounds and broken limbs. These are most valuable to cavity nesters.

2. Do not remove all dead, dying, and decayed trees for timber and firewood.

3. Over the years, try to achieve the following optimum number of snags per each 20 acres of woodlot:

4 to 5 snags over 18 inches DBH
30 to 40 snags over 14 inches DBH
50 to 60 snags over 6 inches DBH

4. Create cavities in trees by selecting a limb at least 3 inches

in diameter and pruning it off about 6 inches from the trunk. Over the years, this will form a natural cavity. Elm, ash, sycamore, mulberry, and basswood are especially prone to forming natural cavities.

5. Create snags by girdling and thus killing a few trees over 12 inches in diameter annually. Girdle by removing a 3-to 4-inch-wide belt of outer bark and inner bark (cambium) around the tree. Select crooked or scarred trees or species of low value if timber production is also a management objective.

6. Provide artificial nest boxes of various dimensions (see table) for various cavity nesters.

7. Bore holes at least 2 inches in diameter to the center of living trees of appropriate sizes (see table) for various cavity nesters. Try to drill the holes just under a limb 3 inches or larger in diameter. The holes will eventually enlarge by rotting and provide cavities.

(Source: Pennsylvania Woodland News, Vol.2, No.4 July/August, 1988.)

CRP - THE ADVANTAGES OF TREE PLANTING

The Conservation Reserve Program (CRP) encourages land owners to plant trees and other protective cover crops on highly erodible cropland. The USDA periodically accepts bids for 10 year contracts to assist with this conservation practice on private land.

In Illinois, 8463 acres of trees have been successfully bid and contracted for during the first six CRP sign-up periods. Nationwide, Illinois ranks fourteenth among all states in CRP tree planting and third among the twenty northeastern states. The average rental payment in Illinois has been $70.54 per acre per year. The range of contract payments were $40 to $90 per acre. The next sign-up period is tentatively scheduled for January, 1989.

When combined with the Illinois Forestry Development Act (FDA), the advantages of tree planting over other cover crops are significant. CRP land planted to trees can qualify for a guaranteed one-sixth of its current equalized assessed value. The cost share payments of both the CRP and FDA can be used together to develop a no-cost establishment of the land to trees.

New changes in CRP have been made to encourage more tree and shrub planting, as well. First, qualifications for tree planting have been relaxed. In previous sign-ups, for a field to qualify for CRP, two-thirds of the field must have been classified as highly erodible land. Now, only one-third of the field must be classified as highly erodible if the landowner agrees to plant trees.

Also, cropland eroding at a rate of 2T is eligible for tree planting. Previously, all land must have had an annual erosion rate of 3T. ("T" is a number determined by the Soil Conservation Service to represent the "tolerable loss" of soil from the land. 2T is twice the tolerable loss.)

Tree planting projects are the only ones that qualify for these reduced erosion values. These changes mean that a field could be eligible for CRP tree planting but not eligible for CRP grass planting.

Additional changes will allow counties to exceed 25 percent of the total cropland in CRP if the

additional acres are planted to trees. Also, land not meeting highly erodible criteria can be eligible if it is used as a filter strip to reduce sedimentation. To be eligible as a filter strip, the area must be located adjacent to a stream, pond or lake, and be 66 to 99 feet in width.

To apply for CRP benefits, you need to contact the USDA Agricultural Stablilization and Conservation Service (ASCS) office in the county where your property is located. They can advise you of the sign-up periods and assist with details. For further information on how to qualify for FDA cost-share payments, you must contact your local Illinois Department of Conservation district forester.

(Source: T.W. Curtin, Extension Forester, University of Illinois, Urbana and Pennsylvania Woodlands News, Vol.2, No.4 July/August, 1988)

CONGRESS INCLUDES DAMAGED TREE PLANTATIONS IN DROUGHT RELIEF PACKAGE

The recently passed drought relief law includes a provision that will help woodland owners who have sustained losses to new tree plantations in 1987 and 1988. The Agricultural Stabilization and Conservation Service (ASCS) is drafting regulations now with a goal of accepting requests for assistance as early as October 1. There are several eligibility requirements to be met before a landowner can receive up to 42 percent of the costs of replanting. Losses must exceed 35 percent of the seedlings planted and trees must have been set for commercial purposes. Plantings for timber, Christmas trees and orchards are included. Both cost-shared and non-cost-shared (privately funded) original plantations will qualify for payments.

(Source: Woodland Report, Vol.5, No.9 September 1, 1988; National Woodland Owners Association, Washington, D.C.)

ILLINOIS' OUTSTANDING TREE FARMER NAMED

Illinois' Outstanding Tree Farmer Award for 1988 goes to Mr. and Mrs. John Regan. Mr. Regan, a retired attorney, and his wife, Evelyn, own a 450 acre tree farm in Brown County near Mt. Sterling. This small, but heavily forested, county in west-central Illinois affords many opportunities for woodland management.

Like many tree farmers, the Regans have accomplished many cultural activities over the years with the guidance and direction of several state foresters. Currently, Bob Church, a district forester with the Illinois Department of Conservation, provides the Regans with technical assistnce, and was responsible for nominating them for this recognition. Some of the Regans accomplishments include the establishment of pine, walnut and pecan plantations on 140 acres, and the thinning and weeding on all of their native timber to improve its health, vigor and species composition. The Regans work tirelessly in their tree plantations experimenting with mulches, fertilizers and pruning techniques.

Perhaps what sets the Regans apart from the average tree farmer is their dedication to the land, their sense of land stewardship, and their willingness to share these values and accomplishments with others. This is illustrated not only in

their forestry accomplishments, but in their conservation approach toward farming practices on their agricultural land, as well. Both the Illinois Department of Conservation and U.S. Soil Conservation Service have used the Regans' property to showcase good conservation and management techniques. Similarly, the U.S. Forest Service has used the Regans walnut plantation to provide training to personnel with the state's Division of Forest Resources on walnut management techniques. The Forest Service also highlighted the plantations in their Black Walnut Advisory Sheet, a newsletter providing information on managing walnut, as one of the best in the midwest. The Regans are also members of the American Forestry Association, Northern Nut Growers Association, the Walnut Council, the American Chestnut Foundation, and the Farm Bureau.

As the state winner of the award, the Regans will be awarded a handsome plaque from the American Forest Council, the sponsor of the American Tree Farm program, and a chainsaw from the McCulloch Corporation.

If you would like information on how you can join the American Tree Farm program contact: Matt Siemert, Secretary, Illinois Tree Farm Committee, 2612 Locust, Sterling, IL 61801.

TREEmendous

TREEmendous features articles related to urban forestry and shade tree maintenance. If you suspect your tree has a disease or insect-related problem which you cannot indentify, we suggest you take a fresh branch specimen showing symptoms of the problem to your county Cooperative Extension Service office for assistance. A CES adviser will help you identify the problem, or will have the sample sent to the University of Illinois Plant Clinic for further investigation. There is a minimal charge for laboratory services performed.

DROUGHT CAN MEAN DEATH TO TREES

The effects of this summer's drought on shade and ornamental trees are being observed throughout Illinois communities. Symptoms of extreme and prolonged water stress coupled with high temperatures are being exhibited on both urban and forest trees. In addition to noticeable damage, trees will be weakened and attacked by pathogens, insects, and injury by severe winter temperatures, perhaps for years to come.

The most obvious damage observed on drought-affected trees occurs on the foliage. On conifers, young, succulent, current-year's foliage may have drooped, yellowed and died. The oldest needles may also yellow and be prematurely shed. Hardwoods will exhibit various symptoms of leaf droop, curl and yellowing or browning. In species such as ash, basswood, hickory and honeylocust, leaf yellowing followed by premature leaf drop is especially common. Other species, especially maples and lindens, develop moderate leaf browning known as "leaf scorch", especially on the sides of the crowns of urban trees growing over pavement on streets and parking lots.

The long-term effects of drought on tree growth and health are variable

and difficult to predict. Smaller trees with root systems that are shallow and less developed than those of large trees with well-established root systems suffer earlier and more severely. Trees on south and southwest exposures, on shallow soil and droughty ridges, or urban trees surrounded by pavement or in compacted soils, will suffer more damage than others. Shoot and diameter growth reductions this year and next year are likely. Some trees will also exhibit partial dieback (death of twigs and branches from the top down and outside in). Epicormic shoots (sprouts arising abnormally along the trunk or limb) may develop in succeeding years on trunks of severely damaged trees. Total death of the crown may also occur; in some cases all above-ground parts of the tree may die even when the root system remains alive.

The subsequent attacks on trees by opportunistic tree pests are just as important as the immediate and obvious visual damage. Normal defense and wound-closure mechanisms are inhibited in trees under drought stress. Thus, the effects of the drought of 1988 will be observed in increased pest activity and associated losses for several years to come.

What can you do for your trees?

Watering is essential to minimize drought damage. Stop fertilizing drought-stressed trees. Use sprinklers, soaker hoses or drip irrigation to apply supplemental water. Remember, 1 - 1 1/2 inches of water must enter the soil each week during the spring, summer and early fall for normal tree function. If the required amount of water does not occur as natural precipitation, you must supplement it yourself. Water the area under the tree branches and a little beyond the drip line. A good rule of thumb is to water the area 1 1/2 times the diameter from the drip line to the trunk. This will help 80 to 90 percent of the active roots which supply water to the tree. Do not water at the tree base. There are few active roots present in that area and you may cause other pest problems.

The best times to water are from 4 to 7 p.m. This is also the time many watering restrictions are in place, so check for local restrictions in your area. Alternative watering times could be up to 10 a.m. and late at night. Night time watering, however, can lead to pest problems on some ground covers.

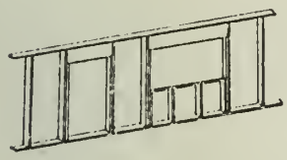
Never spray water on the leaves of a tree. Sunshine on the water droplets can lead to leaf damage. Water on the leaves at night can lead to problems with fungal pathogens. Always water the soil surface directly.

Mulching is an excellent way of minimizing water loss from the soil and it can eliminate competing vegetation without having to resort to weed control chemicals. The farther away from the tree you can keep ground covers, the better for the tree. Pine straw, aged woodchips, pine bark or gravel or rock are good mulches if used wisely and in moderation. Mulches 2 to 4 inches deep are usually enough to provide benefits to your trees.

Remember, in the current drought situation, help to save valuable shade and ornamental trees by watering. For mor information about trees, contact your local county extension adviser or urban/community forester.

Prepared by: Dr. P.J. Weicherding, Area Extension Adviser-Forestry,

University of Illinois, CES Regional Office, Benton, IL



CUTTING UP

CUTTING UP features articles related to the properties of wood for product manufacturing and consumer use. The care of wood products will be addressed periodically.

NEW WOOD PRODUCTS HAVE A DIFFERENT LOOK

There are many new wood products on the market today. Most of the innovations are coming in the area of wood composites. This market used to be dominated by plywood and particleboard, but within the last 15 years many other products have become available. Among these are fiberboard, laminated-veneer-lumber, flakeboard-OSB-waferboard, and glued -laminated beams.

The advent of the flake or wafer products was the result of the increasing cost of veneer-quality logs to make plywood. A concerted effort by industry and the USDA-Forest Service ironed out the technical problems associated with making strong, stiff panels from many small wood particles. Flakes are wood particles with the general geometry of 3 inches in length, one-half inch wide, and 20 thousandths of an inch thick. Flakes are manufactured from southern pine, Douglas-fir, and a number of hardwoods. Wafers tend to be more square in shape, 2-3 inches, and one -sixteenth to one-eighth inch thick. Wafers are manufactured exclusively from aspen. A further refinement is OSB (Oriented Strand Board). In these panels, the particles have been aligned in layers to approximate the orientations found in plywood. These panels are much stiffer in the 8-foot direction than the 4-foot direction. A few general observations about flake-type panels; they are not as stiff nor as strong as plywood in a given size, they are substantially cheaper, houses and structures can be designed safely to use flakeboards, and they pick up water and swell very quickly so they must be protected. Finally, if it seems that flakeboards are taking over the market, it is only an illusion; 80 percent of the twenty-five billion square foot panel market is still plywood.

Another replacement-type product is fiberboard. Fiberboard is bonded wood fibers (much like the fibers found in paper), and it is used almost exclusively in the furniture market. It has largely replaced particleboard in the office and home furniture industry. This has occurred because fiberboard has a smooth surface which can be laminated with plastics and nailed or screwed into the edge. The potential for increased fiberboard use is tremendous. It can be manufactured from a variety of fiber sources including harvesting and sawmilling residues, urban wood wastes, and possibly some agricultural wastes.

Laminated-veneer-lumber is simply plywood with all the veneers arranged in the same direction. This lumber is sometimes seen as headers for garages, but more typically is found in flat trusses and wood I-beams. This material is used in the top and bottom portions with steel, aluminum, plywood or flakeboard in the middle. LVL is a significant advancement in the wise use of wood for structural purposes. It allows the use of low grade

veneer in the center of the lumber where stresses tend to be low and high grade veneer in the outer portion to resist higher stresses.

Glued-laminated beams have long been popular for churches because of their beauty. However, very large structures can be built using these beams. Examples are the domed stadiums at Northern Arizona University, the University of Idaho, and the TacomaDome. It is the intent of current wood design researchers to encourage the use of glued-laminated beams in a large portion of the warehouse and light industrial buildings being built today. In addition to using a renewable resource with low environmental costs, these buildings are actually more safe in fires than comparable metal structures.

Increasingly in the future, our forest resource will be used for wood composites. More complete use of each tree is possible and the composites themselves can be manufactured for very specific end-products. However, more care must be taken when using composites as they are not as forgiving as solid wood. Wood is, and will continue to be, a significant construction material, but in new and more useful forms.

Prepared by: Dr. A.D. Pugel, Assistant Professor of Forest Products, Department of Forestry, University of Illinois, Urbana.

ILLINOIS TIMBER PRICES SURVEY

ILLINOIS
AGRICULTURAL
STATISTICS SERVICE
P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4296

U.S. DEPARTMENT OF AGRICULTURE
ILLINOIS DEPARTMENT OF AGRICULTURE

Illinois Department of Conservation
life and land together

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361

June 21, 1988

PRICE REPORTING ZONES

PRICES PAID ILLINOIS TIMBER PRODUCERS
NOVEMBER 1987 THROUGH FEBRUARY 1988

Winter sawtimber prices paid Illinois timber growers for stumpage and F.O.B. mill were mostly higher than a year earlier. Of the timber buyers reporting volume of their 1987 operations, 48% indicated their volume was 500 thousand board feet or higher. This was down from 37% reported a year earlier on their 1986 operations.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report is prepared by the Illinois Agricultural Statistics Service with the assistance of the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	November 1986-February 1987		May 1987-August 1987		November 1987-February 1988	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	95	234	103	224	118	250
Basswood	45	123	51	121	50	126
Beech	55	112	47	119	40	124
Cottonwood	35	106	38	111	36	110
Sweet Gum	45	116	45	118	42	121
Elm & Hackberry	40	113	42	106	40	114
Hickory	46	118	44	117	44	128
Soft Maple	48	129	47	120	48	128
Sugar Maple	54	125	52	112	57	137
Black Oak	72	127	75	125	85	158
Pin Oak	41	114	48	114	48	122
Red Oak	92	177	114	194	141	201
White Oak	94	175	106	191	127	223
Yellow Poplar	64	134	66	138	73	159
Sycamore	36	113	38	114	36	117
Black Walnut	317	486	273	539	292	546
Woods Run Bottomland	51	119	49	120	49	130
Woods Run Upland	71	133	83	151	88	170
FACE VENEER PRICES $ PER M BD. FT.						
Red Oak	271	524	350	695	394	726
White Oak	764	1,098	815	1,342	803	1,324
Walnut	1,248	1,867	1,085	1,943	1,233	2,047

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	November 1986-February 1987		May 1987-August 1987		November 1987-February 1988	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	2.00	13.33	2.00	13.90	1.90	12.00

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	135	300	112	--	143	288

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS, NOVEMBER 1987-FEBRUARY 1988

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B.MILL	Stumpage	F.O.B.MILL	Stumpage	F.O.B.MILL
		Dollars					
1. Sawtimber							
Ash	M bd.ft.	100-150	125- 382	50 -200	120-360	50 -200	112- 400
Basswood	M bd.ft.	50	125- 130	30 - 70	110-140	30 -100	90 - 150
Beech	M bd.ft.	35 - 50	120- 130	30 - 50	110-130	30	-
Cottonwood	M bd.ft.	30	110- 125	22 - 50	100-130	20 - 80	80 - 130
Sweet Gum	M bd.ft.	30 - 50	80 - 130	30 - 50	110-140	-	-
Elm & Hackberry	M bd.ft.	40 - 50	80 - 130	22 - 60	100-140	20 - 80	80 - 130
Hickory	M bd.ft.	35 - 80	125- 200	20 - 80	110-200	20 -100	80 - 150
Soft Maple	M bd.ft.	40 - 50	120- 135	30 - 70	110-140	30 - 70	100- 150
Sugar Maple	M bd.ft.	40 - 50	80 - 135	40 -100	120-200	30 - 80	110- 225
Black Oak	M bd.ft.	50 -150	125- 250	30 -150	110-170	35 -150	100- 225
Pin Oak	M bd.ft.	40 - 50	125- 150	25 -120	110-140	20 -115	80 - 130
Red Oak	M bd.ft.	60 -250	125- 300	60 -250	120-300	75 -250	120- 275
White Oak	M bd.ft.	125-200	125- 450	50 -200	120-350	70 -250	100- 400
Yellow Poplar	M bd.ft.	50 -100	125- 200	40 -100	110-200	-	100
Sycamore	M bd.ft.	40 - 50	125- 130	20 - 50	110-140	20 - 65	80 - 130
Black Walnut	M bd.ft.	200-300	400-1000	100-450	250-550	150-500	225-1000
Woods Run Bottomlaod	M bd.ft.	50 - 70	125	40 - 70	120-140	30 - 80	140
Woods Run Upland	M bd.ft.	50 -170	125- 250	50 -150	120-220	40 -120	200- 250
		STATEWIDE					
		Stumpage			F.O.B.		
2. Face Veneer							
Red Oak	M bd.ft.	130 - 800			300 -1,600		
White Oak	M bd.ft.	400 -1,500			700 -2,000		
Walnut	M bd.ft.	400 -2,500			1,200-4,000		
3. Pulpwood							
Unpeeled	Ton	1.50- 2.00			12.00		
4. Cooperage							
White Oak	M bd.ft.	75 - 250			250 - 300		

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	95
Scribner	3
International	2

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd.ft.
Zone 1	31	100-150
Zone 2	39	80 -200
Zone 3	45	100-300
ILLINOIS	40	80 -300

VOLUME OF 1987 OPERATIONS

Size in (000)bd.ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	-	26	22	20
100 - 500	15	35	33	32
500 -1000	39	13	19	20
1000-3000	23	13	15	15
3000+	23	13	11	13

Cooperage is the manufacture of barrels. Face veneer: Logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd.ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers.

MARKED TIMBER SALES - NOVEMBER 1987-FEBRUARY 1988

	STATEWIDE STUMPAGE*
Woods Run Upland	$96 - $244/M bd.ft.
Woods Run Bottomland	Insufficient data

*Prices supplied to District Foresters by seller, may include some veneer.

Fred S. Barrett
State Statistician

Dean Hasenmyer, Garry D. Kepley,
Agricultural Statisticians

"Printed by authority of the State of Illinois," 6/21/88, 1,800, 1499

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

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Volume 1, 1989 No. 16

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: **Editor, IFM Newsletter, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.**

This issue features a continuation of our article entitled "Alternative Income Opportunities From Private Woodlands".

BLACK WALNUT PLANTATION MANAGEMENT FOR PROFIT AND PLEASURE

Mention income from timber and the first thing that comes to mind is black walnut. This species has been one of the mainstays of the furniture and veneer industries, and brings a handsome return for high quality trees. If you have idle acres or are considering removing land from crop production, black walnut may prove to be just the opportunity you're looking for. There are cost-share programs available which will help you offset the cost of establishing and maintaining the plantation. This introductory article will help you determine if a walnut plantation can turn your idle acres into a profitable opportunity.

Selecting the Right Site

Many tree planting projects get started with the right intentions, but soon fail because the tree species selected was not compatible with the site (sometimes even the climate). Black walnut is a species that will tolerate a wide range of average site conditions, but to maximize its growth potential in Illinois, here are a few site characteristics you need to keep in mind:

* Not all idle ground is suited to growing black walnut. Often you hear that good agricultural ground is ideal for walnut... maybe not. Agricultural crops are shallow-rooted relative to many tree species. Black walnut develops a extensive taproot which requires deep soil with no obstructions such as a gravel or hardpan layer. Make sure the site you're considering has these soil characteristics:

* **Medium texture** - the best soils for walnut have topsoils of sandy loam, loam, or silt loam over subsoils of the same textures, or sandy clay loam or clay loam. Limestone derived loam to clay loam soils are also good. Avoid heavy clay soils.

* **Deep soil profile and good internal drainage** - the soil depth should extend down at 3 feet before encountering bedrock or a hardpan layer. Avoid sites which exhibit poor internal drainage. Walnut will not tolerate "wet feet". A mottled subsoil (streaks of gray, red or yellow) is a good indication of internal drainage problems. Heavily compacted soils will present an aeration problem as well.

* **Avoid stony soils.**

* **Good fertility** - naturally fertile soils are desirable, but fertilizer can be used to supplement deficient soils. Generally speaking, if the soil is deficient in nutrients for growing agricultural crops, it will be deficient for walnut as well. Bringing fertility up to a level required by agricultural crops will be suitable for walnut. Soils with a pH range of 5 to 8 usually provide the nutrients needed by walnut. Avoid soils with an acid clayey subsoils.

* **Proper aspect** - walnut is a cove hardwood and is found growing in bottomland areas and lower slopes of hilly terrain. Select north- or east-facing lower slopes for best growth. Avoid steep or south- and west-facing slopes or narrow ridgetops. Pay particular attention to potential internal drainage and compaction problems.

* **Avoid droughty soils.**

* **Avoid planting sites that may be potential frost pockets.**

Selecting Suitable Planting Stock

You've heard the expression "putting all your eggs in one basket". Pay particular attention to this phrase when considering a tree planting project. Avoid monocultures or in the case of a walnut plantation avoid planting all of the same cultivar. If an insect or disease problem gets started in the plantation, chances of getting wiped out are far less if you use planting stock from two or three different sources. Here are some options to consider:

* **Using seed** - walnut plantations can be established by using seed. Collect the seed from areas 100 to 200 miles south of your planting site. This will improve growth rates up to 7 percent. Southern-grown trees tend to grow faster than local or northern-grown stock. Do not move seed (or seedlings) more than 200 miles north. You will likely encounter a frost damage problem if you do. Collect seed from as many different trees as possible to ensure a wide variety of genetic background. Weed out those seedlings which seem to fall behind the rest. Keep records detailing where you collected your seed for future plantings.

* **Using seedlings** - many nurseries sell black walnut seedlings. Some deal in grafted stock and others grow their material from seed. Some nurseries develop their own cultivars known for fast growth and excellent form, others sell seedlings grown from seed they have purchased from individuals or collected themselves. Expect to pay more for proven, "genetically superior" planting stock. We can supply you with a directory of walnut seedling suppliers if you write us. Again pay particular attention to the 200 mile rule-of-thumb. Order 10 to 20 percent more seedlings than you need to allow for culling out the "dogs or runts". There's no need to fool with these, they won't produce good trees. Generally, "superior" stock does not need to be graded. You are paying for quality.

Planting and Maintenance

* You must prepare the site prior to planting to eliminate competition from grasses, weeds, or brush. This should be done in the late summer or fall prior to planting the following spring. Planting rows can be cultivated or treated with an appropriate herbicide to control the plant material growing on the site. Check with your District Forester for herbicide recommendations appropriate for your site.

* The spacing between trees and between rows of trees will be dictated by the equipment you have available to maintain the plantation. Generally, spacings of 10 x 10 feet or 12 x 12 feet are recommended for timber production. Variation of spacing within rows or between rows is possible, but you should shoot for planting 436 or 302 trees per acre. Make sure you allow sufficient space between the rows of trees so that you will not damage them with your mowing equipment.

* Spring planting is recommended after any threat of frost-heaving has past. Before planting, soak the seedlings in water for 1 to 2 hours. Keep the entire root system moist during planting by carrying the seedlings in a bucket of water. Dig the hole just prior to planting the seedling and make it big enough to accommodate the root system. Avoid bending the root system back on itself, commonly called "J-roots". This will cause extremely poor growth and even death of tree.

* Weed control is imperative for the first 3 to 4 years of your plantation's development. You need to maintain a weed-free band or circle around each tree approximately 4 feet in width. This can be done with

chemicals or mechanically. Roundup applied as a directed spray at a rate of 1 1/2 - 2 quarts/acre can be used to control competing vegetation, but again, it must be kept off of the trees. Mowing is also important between the rows of trees.

* Fertilizing will improve the growth rate of your trees, but it will also increase the need for weed control. Fertilizing in a young plantation is not suggested. Pole-size stands seem to respond best to fertilization and make the most economical sense. The best suggestion is to choose a plantation site with good fertility levels.

* To maintain good growth rates within the plantation, the trees will need period thinning. It's important to start identifying your crop trees early and manipulate the trees around them to favor their growth. As the trees grow in size, their crowns will begin to fill in and touch. If left in this condition, all of the trees will experience suppressed growth rates. It is important to recognize that not all the trees you originally planted will make it to harvest time. Most will serve as "trainers" for the crop trees you select. Expect to do periodic thinnings every 10 to 15 years depending on the site conditions.

* Your crop trees will need special attention, too. They may need corrective pruning to eliminate forks and promote straight boles, and they certainly will need to be pruned periodically to produce knot-free lumber and veneer that brings top dollar for your efforts. Pruning is labor intensive, but pays for itself in the long-run. We recommended that you prune your crop trees up to 17 feet in height. Lateral pruning is done over a period of years to minimize any affect on the growth rate of the trees.

* You'll need to keep a watchful eye for signs of insect and disease problems as well. Walnuts are particularly susceptible to anthracnose, walnut caterpillar, leaf spot, canker, and twig and stem borers.

Expected Returns?

Obviously, making a "wholesale" statement about economic returns is impossible because everyone's situation is different. However, Dr. Gene Campbell, University of Illinois Forest Economist, recently completed a study which revealed some interesting economics figures for black walnut. Dr. Campbell's study looked at two different management strategies; production of timber only, and combining timber and nut production. Recommended management techniques were followed in the study and the site was assumed to be average to good for black walnut. Dr. Campbell's study netted a return of $12,655 per acre for timber only, and $21,122 per acre for the timber and nut strategy. It should be understood that this is a net return over a 70 year period. Your property and specific situation may or may not reflect the conditions set forth in Dr. Campbell's study. In any case, the figures are benchmarks to show what is possible. If you would like a copy of Dr. Campbell's report entitled Timber Income Opportunities - Illinois Forest Landowners, 1989, please send a $3.00 check payable to Department of Forestry to: Department of Forestry, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.

You also may wish to purchase a copy of the recently published Walnut Notes. This is an excellent compilation of articles written by walnut research experts. It available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Request: Walnut Notes, USDA Forest Service - North Central Forest Experiment Station

Source: Walnut Notes, USDA Forest Service; 1989.

SilvaScene

HOW TO RELEASE CROP TREES IN PRECOMMERCIAL HARDWOOD STANDS

What is crop tree release?

Crop tree release is the selection and release of desirable trees by removing adjacent competing trees.

Why should crop trees be released in precommercial stands?

Precommercial crop tree release increases tree diameter and helps ensure survival. Released trees become mature sooner and/or attain a larger size at maturity.

What is a crop tree?

A crop tree can be any tree that you want to retain. For sawlog production, timber crop trees in precommercial stands should be high value species, dominant or codominant in canopy position, straight, free of main stem forks in the lower 17 feet of the bole, and vigorous with no sign of top dieback or insect or disease damage.

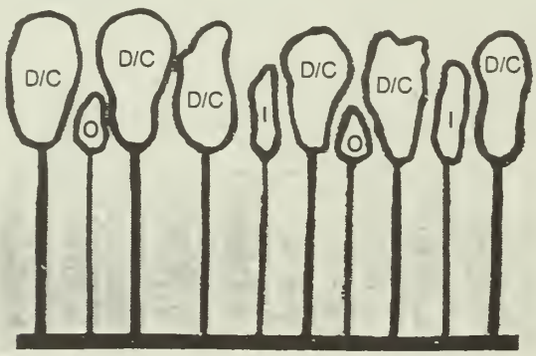


Figure 1.—Dominant/codominant (D/C): Trees with crowns forming the general level of the crown cover and receiving full light from above, but little from the sides. Intermediate (I): Generally shorter than dominant/codominant, with crowns extending into the crown cover, but receiving little direct light from above and none from the sides. Overtopped (0): Trees with crowns entirely below the general level of the crown cover, and receiving no direct light.

Wildlife crop trees can be den trees and mast producers such as oaks, hickories, or beech. In areas where there are only a few dominant or codominant mast producers, some wildlife crop trees can be intermediate crown class (See Figure 1.)

When should crop trees be released?

Dominant or codominant crop trees can be released any time after they have reached a height of about 25 feet. This usually occurs between the ages of 10 and 15 years.

How many crop trees should be released?

In most cases 50 to 75 crop trees per acre are released. It is of little value to release timber crop trees that will be removed in future intermediate cuttings. Therefore, never release more than 100 crop trees per acre in precommercial stands.

How should crop trees be released?

Apply a crown-touching crop tree release by cutting **all** trees (except other crop trees) whose crowns **touch** the crop tree crown. Normally, it is not necessary to cut overtopped trees (See Figure 2)

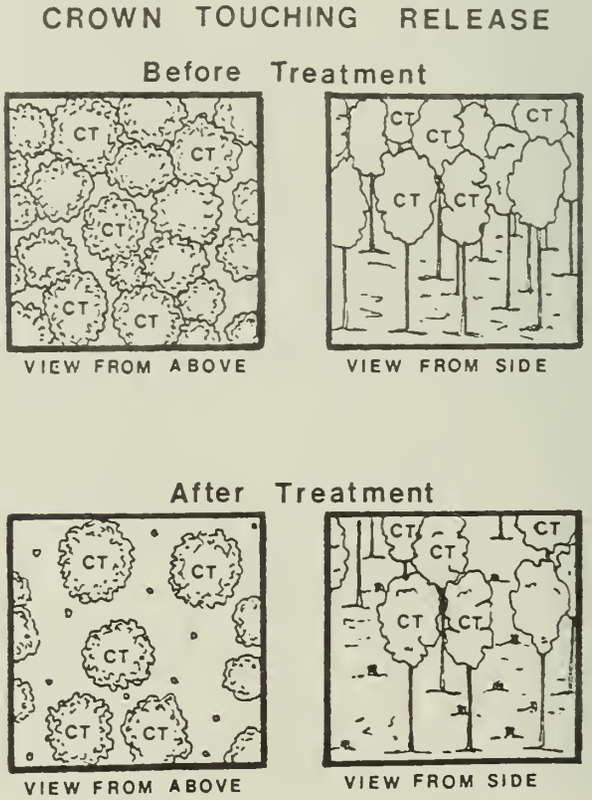


Figure 2.—Aenal and side views of stand prior to and after application of crown touching release to crop trees (CT).

In areas within stands where no suitable crop trees are found, do not cut any trees. Remember, crop tree release is cutting only trees that are competing with crop trees. It is not selecting crop trees and cutting all other trees in the stand!

Try to pick crop trees about 25 feet apart (See Figure 3). Occasionally, two crop trees may be left close to each other. Treat their crowns as a single crown and apply a crown-touching release. Do not leave groups of more than two crop trees close to each other.

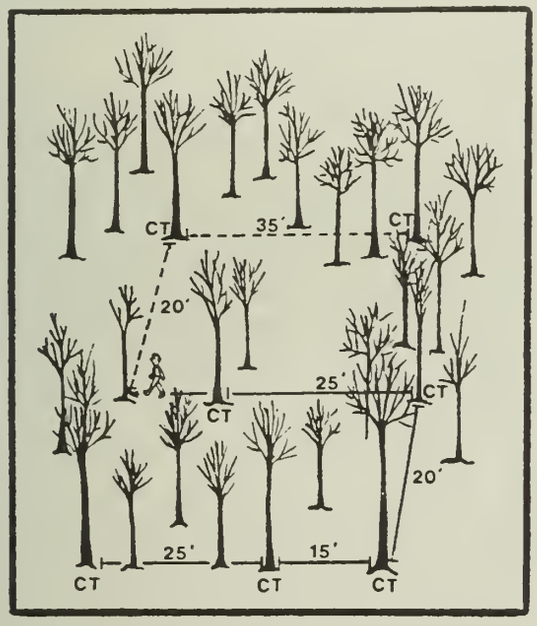


Figure 3.—Try to space crop trees (CT) 25 feet apart and you will end up with a sufficient number of trees per acre. Some crop trees can be spaced 15 feet apart, and others 35 feet apart.

Generally speaking, using a chainsaw to release crop trees is cheaper than using herbicides (basal spraying or injecting). It takes about three minutes to release a crop tree using a chainsaw. When competing trees are being felled, it is easy to see which trees still need to be cut. Also, herbicides cannot be used to release sprout-origin crop trees.

What about stump sprouts?

Stump sprouts are fast-growing and will respond to release. However, stump sprout crop trees must originate at or near groundline so that as the parent stump decays the crop tree will not break off or develop butt rot.

Release one or two widely spaced crop trees per clump. Select trees with a U-connection rather than those having a V-connection (See Figure 4).

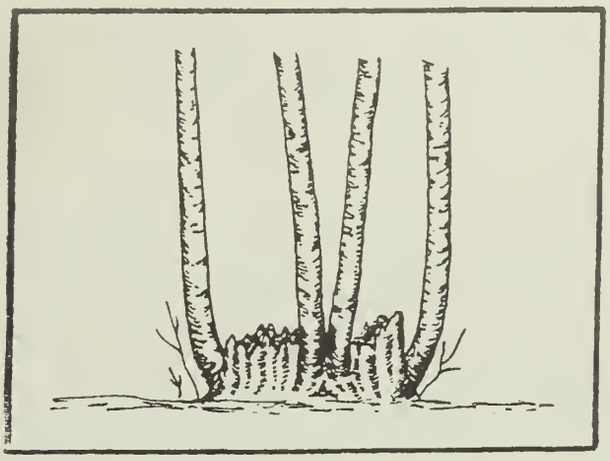


Figure 4.—Stump sprouts connected in a "U" shape as shown by the two outside stems are acceptable choices for crop trees; but "V" connection sprouts (center) generally should not be considered.

For additional information about crop tree release contact:

USDA Forest Service
Northeastern Forest Experiment Station
Timber and Watershed Laboratory
P.O. Box 404
Parsons, WV 26287

USDA Forest Service
Northeastern Area
State and Private Forestry
Morgantown, WV 26505

-or-

Your Illinois Division of Forest Resources **District Forester**. His or her name and address can be obtained by writing the **Illinois Division of Forest Resources, 600 N. Grand Ave., West, Springfield, IL 62706.**

Source: USDA Forest Service, Northeastern Forest Experiment Station, NE-INF-80-88.

WOOD 'N NICKELS

CONSERVATION EASEMENT CAN REDUCE YOUR DEBT

What is a Conservation Easement?

A conservation easement is an agreement that a landowner makes with an outside party to restrict the type and extent of development that may take place on his or her property. With an easement,the outside party holds certain property rights while the landowner still owns the land.

What are FmHA Conservation Easements?

The FmHA Conservation Easement Program was created by the 1985 Food Security Act to assist FmHA borrowers under financial stress. Starting in November 1988, eligible farmers may request debt relief in exchange for a conservation easement that must last at least 50 years and can be perpetual in some cases.

What are the Benefits?

The main benefit of conservation easements is that it allows you to writedown some of your debt so that you can continue farming. In addition, you can negotiate with the easement holder to earn income from the easement land and to be reimbursed for any management expenses.

Conservation easements provided many indirect benefits as well. For example, they may improve water quality,help control soil erosion, and provide flood protection. Easements are also valuable for protecting fish and wildlife for conservation and recreation purposes.

There are several cost associated with a conservation easement. One cost is the restrictions placed on the use of the land in the easement. Another cost is the income lost from crop production from land in the easement which was previously cropped. Finally, there may be some income and property tax implications which you should have evaluated by a tax advisor.

Which Lands Qualify?

Conservation easements may be established on land that is wetland, upland, highly erodible land or wildlife habitat; for conservation, recreation, and wildlife purposes. The land must have been either row-cropped or set aside for a row-cropping system each year in 1983, 1984, and 1985, except for wetland or wildlife habitat.

Which Farmers Qualify?

A farmer may be eligible for debt relief if he or she is at least 30 days late on a payment to FmHA. Only farmers that received FmHA loans before December 23, 1985, qualify. Debt writedowns, which includes both nonrecourse writedowns and conservation easements, can be employed only after other attempts have been made by FmHA to service delinquent farm debt. These options include, rescheduling and reamortizing loans, and adjusting interest rates and loan payments.

The selection of a conservation easement for debt relief, in combination with all other methods, will give you the best chance to continue farming and to meet your financial needs. The conservation easement option allows farmers to reduce their loan amount further than other options. This option may make it possible for farmers to maintain a reasonable cash flow and to remain solvent where other servicing options fail.

Who Holds the Easement?

An easement holder may be any federal, state or local government agency, or any non-profit organization. The holder is responsible for monitoring the easement and ensuring that the terms of the easement

agreement are met. The U.S. Fish and Wildlife Service may assist in monitoring and enforcement as well. Any management needed on the easement may be carried out by the easement holder or delegated to another party, including you. An easement holder may assume responsibility for managing conservation values, while the farmer continues his or her farm management activities.

What Restrictions Apply?

Generally, the terms of a conservation easement will specify those restrictions that are necessary to protect the conservation, recreation, and wildlife values of the property. You and the easement holder can negotiate which restrictions will be placed on the easement. together, you can decide who may enter the property, which uses are appropriate, and whether access fees should be charged.

What You Can Do

Contact your local FmHA agent to discuss how conservation easements can help you. It may be that public interest groups or natural resource agencies may have already expressed an interest to FmHA about special natural resources in your area. Your farmland could be eligible and therefore could satisfy several mutual benefits.

Through the FmHA conservation easement program, not only can you continue farming, you can also be proud of protecting important resources affecting your family and community.

Source: United States Environmental Protection Agency. Conservation Easement Can Reduce Your Debt, December 1988.

For complete details, see Federal Register, Vol. 53, #178, Wednesday, September 14, 1988. pp. 35638-35798.

Bugs 'n Blights

HOW TO IDENTIFY AND CONTROL RHIZOSPHAERA NEEDLECAST

Rhizosphaera needlecast, caused by the fungus **Rhizosphaera kalkhoffii**, seriously damages blue spruce trees in nurseries and Christmas tree plantations in the north-central States. Although some trees are killed, the primary damage has been premature needlecast, rendering the tree unmerchantable.

Symptoms

Current-year needles are infected in May and June. Symptoms appear in late fall or the following spring, when fruiting bodies of the Rhizosphaera fungus appear in the stomata of infected needles. When magnified, these stomata appear as fuzzy black dots instead of the usual white color. The infected 2-year-old needles turn yellow in July and purplish-brown in late August. Most needles are cast in late summer, although some adhere overwinter and produce spores the following spring. The disease usually attacks the lower branches first and then spreads upward through the tree's crown.

Spread

Tiny spores called hyaline conidia are released from the fruiting bodies during wet weather in late spring. Rain-splash disseminates them to infect other needles. Ironically, spores may also be spread from tree to tree on the tools used to shear Christmas tree plantations, especially if shearing is done when foliage is wet. However, most infections in plantations result from infected planting stock.

Control

Cultural

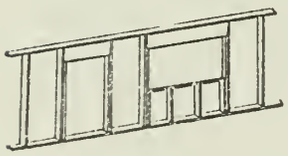
* Use healthy planting stock.
* Identify disease early to minimize losses.
* Discard seedlings that have fruiting bodies in the stomata.
* Shear trees in healthy plantations first.
* Sterilize tools by dipping in denatured alcohol for 3 minutes.
* Avoid shearing infected trees when foliage is wet.

Chemical

Trees should be sprayed with Bordeaux mixture 8-8-100 (hydrated lime-copper sulfate-water) early in June and again in July. Chlorothalonil is also effective in controlling this disease.

Source: How To Identify and Control Rhizosphaera Needlecast, USDA Forest Service, North Central Forest Experiment Station bulletin

EDITOR'S NOTE: A blue spruce growing in your yard can also be affected by this disease. Your county Cooperative Extension Service office can help identify tree and shrub insect and disease problems and recommend corrective treatment. Samples may need to be sent to the University of Illinois Plant Clinic for examination and culture. Contact your county Cooperative Extension office for more details.



CUTTING UP

TERMITES AND ANTS
How To Tell The Difference

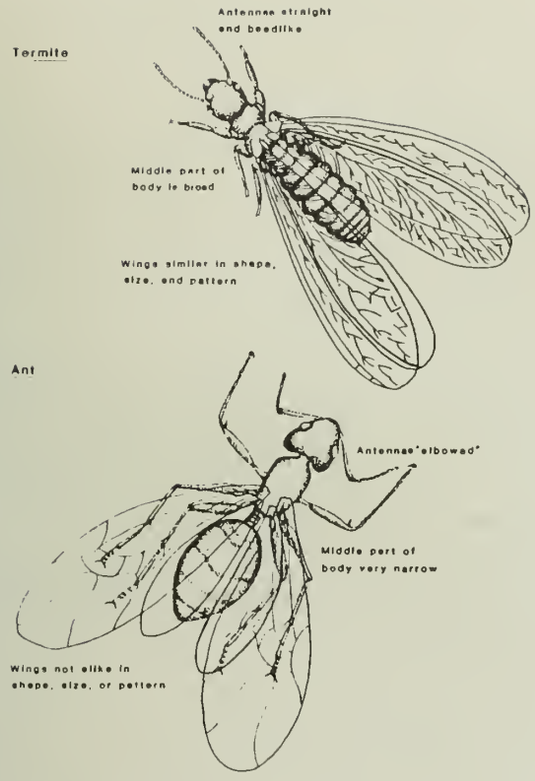
The thought of termites strikes fear into the heart of most home owners. It's estimated that the annual cost from termite damage and control efforts probably exceeds $750 million. Much of the heavy damage occurs in the warmer climate of the southeastern U.S., but in Illinois moderate to heavy damage does occur. Most of the damage to homes and other wood structures such as utility pole sheds and fence posts is done by subterranean termites. It should be noted that termites in their natural habitat are considered beneficial insects because they help to break down natural plant materials, but when they attack wood structures, they become insect pests.

Subterranean termites live in the soil and feed on wood above or below ground. Generally, they are dependant on an external supply of moisture and must maintain a moist environment in order to survive. In situations where leaky pipes or gutters keeps wood in a moist condition, termites can survive without having to return to the soil.

How To Tell Termites From Ants

Most home owners never see the signs of termites until a swarm of reproductive adults appears or the colony's feeding damage causes structural failure. Often these "flying termites" turn out to be winged ants...here's how to tell the difference.

Ants have two pairs of transparent wings of unequal size. Termites have four, translucent wings of equal size. Pay particular attention to region of the body behind the wings called the abdomen. Ants have a pinched or constricted body between the thorax and the abdomen sections. Termites have a more or less uniform body without a constriction. The antennae of ants are "elbowed" or jointed. Termite antennae are straight and take on the appearance of tiny beads joined together (see illustration on next page).



Note the illustration shows only the winged reproductive termite. The worker and soldier castes are gray to yellow-white in color. Generally, you do not see them unless active feeding areas are exposed.

Termites will be abundant where the soil is warm, moist and ladened with ample food supply, wood. Where untreated wood is buried in the soil or laying on top in direct contact with it, you're likely to encounter termite damage. In situations where a colony has become established but begins to run low on food, extensive tunnel systems are developed within the soil to a new food supply. Frequently, the wood they're after is not in direct contact with the soil, so the termites construct mud or soil tubes between the ground and the food supply. The mud tubes maintain a moist environment which is critical to the termites survival. Discovering mud tubes on your foundation wall is one way to identify that you have a termite problem. To determine if the colony is actively feeding on the wood in your home, simply destroy part of the tube and watch to see if it is re-built.

If you discover that you have termites, don't panic! They're destruction is slow, relatively speaking. Don't feel like you have to rush out and do something tomorrow...but don't put off the inevitable either. Corrective treatment is possible with chemical control. Structural changes may be necessary too to avoid repeated attacks.

For more detailed information on termites and their control consult the USDA-Forest Service publication Subterranean Termites-Their Prevention and Control in Buildings; Home and Garden Bulletin 64. This information-packed bulletin is for sale from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

Source: Subterranean Termites-Their Prevention and Control in Buildings. USDA-Forest Service Home and Garden Bulletin 64; 1989.

DOYLE RULE BECOMES THE SCALING STANDARD IN ILLINOIS

Recently the Doyle Log Rule and Tree Scale became the standard rule by which all timber growing on private woodlands will be measured. Historically, the Doyle Rule has been used by the timber industry to scale and purchase timber. Traditionally, the forestry profession has used the International 1/4 Inch Rule which more closely approximates the true board foot volume that can be cut from a standing tree or log. Recognizing that the use of two different rules can lead to confusion, especially for private woodland owners, the Illinois Division of Forest Resources and the Illinois Wood Products Association agreed to standardize volume estimation by adopting the Doyle Rule as the standard for Illinois. While this rule has some short-comings in that it underscales the board foot volume cut from small to medium size trees (up to 26 inches) and overscales volume cut from larger trees, the important point to recognize is that Illinois now has a standard rule which everyone operates under.

However, this does not eliminate the need for woodland owners to seek out numerous competitive bids for their timber. The point cannot be emphasized enough that

increasing the number of bids for your timber will assure you of a fair price based on current market conditions. Keep in mind too, that timber buyers must be licensed in Illinois, and they are required by law to deduct a four percent harvest fee from your negotiate sale amount. This fee and the appropriate paperwork is sent to Springfield by the timber buyer. The funds appropriated from this harvest fee are used to support tree planting and forest improvement activities on private land. Check with your IDOC District Forester for details on how you and your woodland can benefit by enrolling in the Forestry Development Act (FDA) cost-share program.

ACORNS SPELL TROUBLE FOR CATTLE

Landowners who run cattle in their woodlands could be in for serious trouble this fall when acorns mature and fall to the ground. Acorn consumption seems to be habit forming. Once cattle get a taste, they just keep eating acorns even if good pasture is available. Oak leaves may also present a problem, but consumption is usually minimal when other feed supplies are adequate.

Tannin in the acorns is the basis for the problem. The early signs of acorn feeding is constipation. As further breakdown of tannin to tannic acid occurs, the problem becomes increasingly hazardous. Cattle will breathe rapidly; show a brownish, mucous discharge from the nose; and develop swelling in the lower portions of the body. Lactating cows will dry up. Constipation will change to diarrhea. By this time, death is imminent.

The only sure preventive measure is to prohibit grazing in wooded areas when acorns are falling. Treatment is helpful in the early stages. Give a general laxative such as mineral oil or epsom salts. By all means, work with your local veterinarian.

Source: Ruth Hambleton, Washington County Agriculture Extension Adviser, Illinois Cooperative Extension Service.

DIAGNOSING TREE INJURIES

Foresters and woodland owners interested in identifying tree problems will find Diagnosing Injury to Eastern Forest Trees a useful reference. This 122-page manual cover the symptoms caused by the major air pollutants, pathogens and insects. Both the text descriptions and the 220 color illustrations combine to make this glossy manual an excellent diagnostic reference. The manual is available for $9.00 from the **Publications Distribution Center, 112 Agricultural Administration Building, University Park, PA 16802.**

Source: Forest Resources Letter, July 1988 N.C. State University, Raleigh, NC

CHEMICAL BARRIER KEEPS ROOTS AWAY

A chemical barrier system has been developed that can protect sidewalks and streets, swimming pools and tennis courts, and other structures such as foundation walls and septic systems or sewer lines from damage by tree roots.

Typar Biobarrier root control system was developed through a joint effort of Reemay, Elanco Products and Battelle Pacific Northwest Labs. The Biobarrier can last in excess of 100 years.

Treflan herbicide mixed with carbon black and polyethylene is formed into pellets. The carbon black and polyethylene provide a reservoir for the herbicide and protect it from being degraded by ultraviolet light. At the same time, they help control the rate at which the Treflan is released into the soil.

"The identification of the class of herbicides known as dinitroanilines (of which Treflan is a member) was very critical to the success of the program," notes Peter Van Voris, Ph.D., Battelle program manager and staff scientist. "They are the only EPA-registered herbicides that inhibit root growth without killing the plants."

The pellets, molded into hemispheres, are attached to Typar 3401 geotextile, a non-woven spunbonded polypropylene fabric that is permeable to water and air. Trial batches were tested in 1987. Full-scale commercial production of Typar Biobarrier began in 1988.

The Treflan pellets were originally invented for a Department of Energy project designed to find a long-lasting way to keep plant roots from penetrating uranium mill tailings burial sites throughout the western part of the country.

Source: Landscape Management, December 1988.

FOREST REAL ESTATE APPRAISAL COURSE OFFERED

A forest real estate appraisal correspondence course is available through the University of Vermont. The correspondence course parallels the in-residence course offered at the U of V and is available for $147.00 Included are six, 90-minute audio tapes, lecture notes, multiple choice questions, and other related information. For details or enrollment write: **Continuing Education, University of Vermont, 322 S. Prospect St., Burlington, VT 05405.**

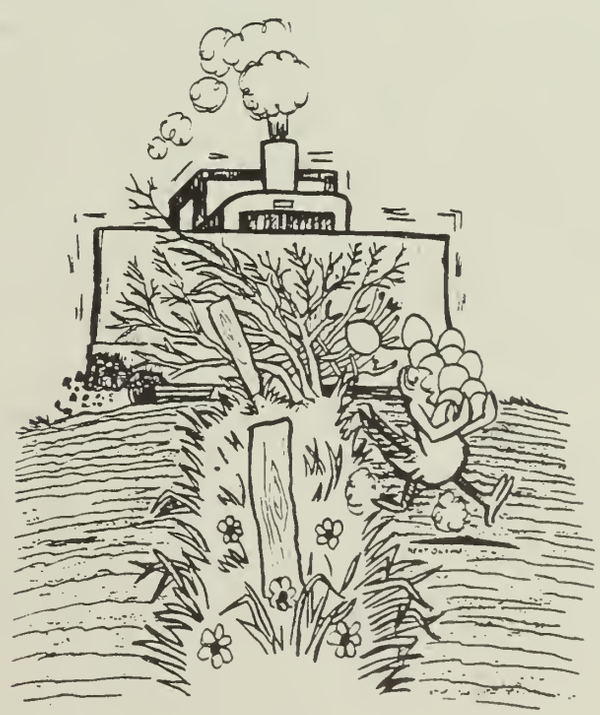
TRACKS features articles on small game and nongame management for woodland owners. If you have a particular question you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

HEDGEROWS AND FIELD BORDER MANAGEMENT

by Steve Capel, Regional Wildlife Supervisor, Kansas Fish and Game Commission

Borders along cultivated fields or grasslands can help protect fields from drying winds and erosion, stabilize turn rows at the ends of row crop fields, and at the same time, provide that most important form of wildlife habitat, **edge**. Wildlife depends heavily upon such edges; the necessities of wildlife are more apt to be met when two cover types converge than when only one cover type is present. Field borders determine the quality of edge habitat and can take a variety of forms.

Osage-orange hedgerows, multi-row shelter belts, and unmowed grassy road ditches are among the higher quality field borders. Almost every field border has some wildlife habitat potential. There are two ways to improve field borders: a) widen to provide more edge, and b) diversify to provide for more wildlife needs within the same border. Equally as important, as improving field borders, is the maintenance of those high quality borders already in existence.



Widening Field Borders

Field borders adjacent to creek timber, hedgerows or similar woody habitat can usually be improved by planting a 25-50 foot strip of mixed native grasses. This combines the woodland escape cover and loafing cover already present with the nesting roosting, and brood-rearing qualities of the grass. Since little row crop production usually occurs adjacent to such timber, very little if any farm production is lost...and a hay crop could be cut.

Field borders between croplands or between cropland and range can be improved by adding one or two rows of shrubs. A row of cedars on the non-cropland side and a row of high-wildlife-value shrubs on the cropland side can make a world of difference and take only 20-25 feet along the field edge. If the border is between two crop fields, more habitat diversity can be achieved by planting the two rows of shrubs for 50 feet and then planting grass for 200 feet and alternating shrub clumps and grass strips along the border from one end to the other. Taking advantage of existing plum thickets or clumps of dogwood already growing in the fence will give a good start in border diversity if the farmer would simply move out from the fence line 20 feet and let the plum, sumac, and dogwood already there spread out into a small thicket. Grasses and forbs that will fill in the remaining area are almost all valuable for wildlife. One of the main purposes in widening a field border is to make it comparatively more predator-proof. Thus, the wider the better.

Border Diversity

A woody field border can be diversified by adding other woody or shrubby species. Often these borders have clumps of trees and shrubs and then big gaps that are farmed closer to the fence. Planting some shrubs of high wildlife value like autumn olive, plum, chokecherry or honeysuckle in between the existing trees will help.

If the border is mainly elm, cottonwood, or mulberry, some brush piles can be built or some of the elm and mulberry half-cut. Deer, quail and rabbits will love the improved browse and ground-level cover. A wide variety of song birds will use these as well.

Diversity can be achieved by adding a strip of legumes along the edge or in the corners. Many nesting birds seek out legumes. Simply discing a strip along the field edge during routine seedbed preparation, then leaving the ground alone, will allow a mixture of annual forbs (desirable "weeds") to come in. This makes fine food and cover at minimal cost although good for only two or three years.

The key in achieving field border diversity is taking advantage of what is presently growing, then adding a growth form or species that is missing. Anything done to create different vegetation forms will be an improvement.

Another practice that falls within field border management is fencing small pasture corners to provide undisturbed grassy cover. After choosing a corner with existing cover nearby, a fence is run diagonally across the corner from about 8-10 fence posts each way from the corner, creating a triangular enclosure.

With larger farming equipment, corners of cultivated fields and other irregular areas are becoming good candidates for border management. Planting small plum thickets, grass or legumes or simply letting the patches go to weedy cover is beneficial.

Hedge rows that are the same age throughout their length are not as valuable as hedge that has been partially harvested for posts every few years. If the hedge is partially cut every few years, a variety of different growth forms result - mature, tall, spreading hedge; premature hedge, tall and spindly; and the newly re-sprouting hedge that is dense and thick. This can also be an added source of revenue, as fence posts or firewood.

Don't Let Hedge Rob Moisture

A frequent reason for farmers removing hedge rows is the lack of moisture available for adjacent crops. An obvious loss of crop production can be observed along hedge rows. One solution is to plant wheat next to the hedge. Another solution is to prune hedge roots so they do not rob moisture from adjacent cropland. Root zones of 100 feet have been recorded.

Hedge root pruning can be done several ways. Many bulldozers have ripper blades that will prune roots three feet under the ground surface. Sink the blade into the ground adjacent to the hedge (just below the outer branches) and rip the entire length of the hedge row. Some farm implements such as single row sub-soilers and long-shanked chisels can be pulled at their deepest setting adjacent to the hedge and accomplish the same thing. Occasionally, it is best to start out 8-10 inches deep and go back over the same furrow at a greater depth a second or even third time to save wear and tear on equipment. The goal is a trench or furrow at least 18 inches deep and preferably two feet deep. Most hedge roots are in the top 24 inches of soil. The hedge row can survive even though both sides have been root-pruned.

Results of root pruning are long lasting. A treatment will last at least four years and frequently longer. In a dry year, yield increase of 100 bushels of milo next to one-half mile of hedge are typical. In a wet year, yields are increased 25-30 bushels per half mile. When compared to the cost of root-plowing one-half mile of hedge at approximately $25, that is a handsome return! Cultivation of cropland should take place over the root-pruned furrow or else the practice will result in a second hedge row coming up at the root-prune furrow.

Reprinted with permission from: **Guidelines for Increasing Wildlife On Farms and Ranches**. Great Plains Agricultural Council Wildlife Resources Committee and Cooperative Extension Service, Kansas State University - Manhattan; April 1988.

EDITOR'S NOTE: This publication is a compilation of over 600 pages of useful information on wildlife habitat management around the farm. A copy can be obtain by sending a **$27.00 check** payable to Kansas State University to: **Wildlife Habitat Handbook, 118 Umberger Hall, Kansas State University, Manhattan, Kansas 66506.**

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ILLINOIS TIMBER PRICES

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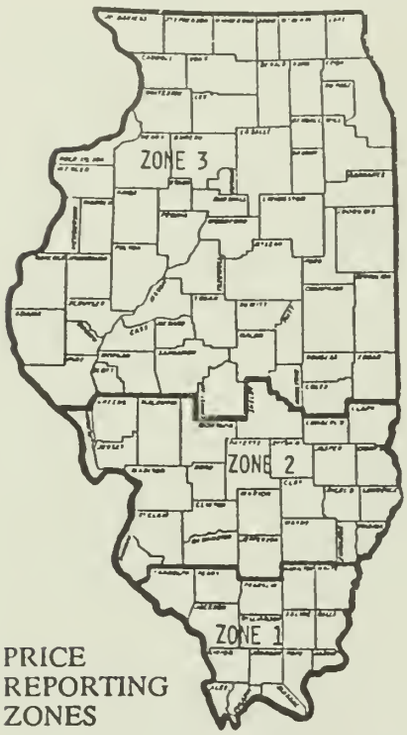
June 21, 1989



PRICE REPORTING ZONES

PRICES PAID ILLINOIS TIMBER PRODUCERS NOVEMBER 1988 THROUGH FEBRUARY 1989

Winter sawtimber prices paid Illinois timber growers for stumpage and F.O.B. mill were mostly higher than a year earlier. Of the timber buyers reporting volume of their 1988 operations, 36% indicated their volume was 500 thousand board feet or more. This was down from 48% reported a year earlier on their 1987 operations.

This report is prepared by the Illinois Agricultural Statistics Service with the assistance of the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	November 1987-February 1988		May 1988-August 1988		November 1988-February 1989	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	118	250	130	266	118	271
Basswood	50	126	52	133	63	145
Beech	40	124	44	120	44	124
Cottonwood	36	110	33	111	41	118
Sweet Gum	42	121	39	121	47	125
Elm & Hackberry	40	114	37	117	47	127
Hickory	44	128	48	131	52	136
Soft Maple	48	128	45	126	54	135
Sugar Maple	57	137	56	130	58	150
Black Oak	85	158	102	164	101	159
Pin Oak	48	122	40	119	49	124
Red Oak	141	201	151	264	156	314
White Oak	127	223	133	237	137	289
Yellow Poplar	73	159	69	159	74	166
Sycamore	36	117	37	113	40	127
Black Walnut	292	546	318	530	326	512
Woods Run Bottomland	49	130	56	131	57	125
Woods Run Upland	88	170	102	189	99	140

FACE VENEER PRICES $ PER M BD. FT.

Red Oak	394	726	391	781	440	840
White Oak	803	1,324	872	1,335	851	1,525
Walnut	1,233	2,047	1,382	2,059	1,443	2,092

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	November 1987-February 1988		May 1988-August 1988		November 1988-February 1989	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	1.90	12.00	1.71	13.58	1.88	-

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	143	288	184	334	198	440

Timber Prices
November 1988-February 1989
June 21, 1989

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
NOVEMBER 1988-FEBRUARY 1989

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber							
Ash	M bd. ft.	50 - 200	100 - 500	50 - 200	120 - 500	50 - 200	125 - 330
Basswood	M bd. ft.	40 - 100	150 - 200	40 - 80	110 - 120	30 - 100	125 - 200
Beech	M bd. ft.	40 - 50	100 - 150	30 - 50	110 - 120	-	100 - 150
Cottonwood	M bd. ft.	30 - 50	100 - 140	25 - 60	100 - 140	20 - 70	75 - 160
Sweet Gum	M bd. ft.	35 - 50	100 - 140	30 - 60	100 - 150	70	130
Elm & Hackberry	M bd. ft.	40 - 50	100 - 140	25 - 60	100 - 150	20 - 100	100 - 150
Hickory	M bd. ft.	35 - 100	100 - 200	30 - 100	100 - 200	20 - 100	100 - 150
Soft Maple	M bd. ft.	40 - 80	100 - 150	40 - 60	100 - 150	30 - 100	100 - 175
Sugar Maple	M bd. ft.	40 - 100	125 - 200	40 - 70	100 - 200	40 - 80	125 - 180
Black Oak	M bd. ft.	40 - 200	100 - 250	35 - 200	120 - 200	50 - 150	100 - 200
Pin Oak	M bd. ft.	40 - 50	100 - 140	30 - 60	100 - 150	20 - 100	80 - 160
Red Oak	M bd. ft.	150 - 250	100 - 550	50 - 250	120 - 550	50 - 250	150 - 400
White Oak	M bd. ft.	50 - 250	100 - 565	60 - 200	120 - 650	50 - 230	145 - 330
Yellow Poplar	M bd. ft.	50 - 100	100 - 200	50 - 70	100	50	150 - 170
Sycamore	M bd. ft.	30 - 80	100 - 140	20 - 60	100 - 150	20 - 40	130 - 150
Black Walnut	M bd. ft.	100 - 600	200 - 720	200 - 600	450 - 650	200 - 600	420 - 650
Woods Run Bottomland	M bd. ft.	30 - 100	100 - 150	35 - 100	100 - 160	30 - 100	120 - 150
Woods Run Upland	M bd. ft.	55 - 200	100 - 180	40 - 150	120 - 200	50 - 200	120 - 160

		STATEWIDE	
		Stumpage	F.O.B.
2. Face Veneer			
Red Oak	M bd. ft.	300 - 800	600 - 1,000
White Oak	M bd. ft.	300 - 1,600	700 - 2,000
Walnut	M bd. ft.	500 - 4,000	700 - 4,000
3. Pulpwood			
Unpeeled	Ton	1.50 - 2.00	-
4. Cooperage			
White Oak	M bd. ft.	100 - 300	350 - 500

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	96
Scribner	3
International	1

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	14	150 - 200
Zone 2	44	80 - 200
Zone 3	34	140 - 250
ILLINOIS	33	80 - 250

VOLUME OF 1988 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	20	17	31	24
100 - 500	25	55	34	40
500 - 1000	15	14	9	12
1000 - 3000	15	11	13	12
3000 +	25	3	13	12

Cooperage is the manufacture of barrels. Face veneer: Logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers.

MARKED TIMBER SALES - NOVEMBER 1988 - FEBRUARY 1989

	STATEWIDE STUMPAGE*
Woods Run Upland	$62 - $400/M bd. ft.
Woods Run Bottomland	$53 - $142/M bd. ft.

*Prices supplied to District Foresters by seller, may include some veneer.

Fred S. Barrett
State Statistician

Dean Hasenmyer, Garry D. Kepley,
Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 2, 1989 No. 17

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter feature timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: **Editor, IFM Newsletter, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.**

This issue features a continuation of our article entitled "Alternative Income Opportunities From Private Woodlands".

PRODUCING FIREWOOD FROM SMALL WOODLOTS

There's something about a wood fire. Granted gas logs are convenient, cause little mess, and won't pollute the environment or fowl the chimney with creosote, but most homeowners still prefer a real wood fire. During the 1970s with oil shortages staring us in the face and the price of home heating fuels escalating monthly, many homeowners were able to lower their heating bills by making a switch to wood heat. Between 1977 and 1982, Illinois saw the consumption of fuelwood rise 110 percent (Burde and McCurdy, 1984). Since that time, energy costs have continued to increase, but not as dramatically as during the above period. Interest in wood heating has waned from the self-sufficiency movement of the early 1980s. Families who switched to wood heating systems still use them today, however there's not a proliferation of new systems being installed in homes which previously were without a wood stove or furnace. Where Illinois has seen a continued rise in wood-using appliances is the installation of efficient central heating systems and fireplace units in new homes. Based on a study conducted by Southern Illinois University's Department of Forestry, if one assumed, 1) the number of households burning wood in 1988 increased by 50 percent over 1983 levels, and 2) the rate of fuelwood consumption increased by 18 percent (as estimated by the survey responses), 3 million cords of fuelwood would need to be harvested to supply the need. It's reasonable to expect the level of consumption to increase slowly during the next decade. Therefore, the production of firewood from small woodlots offers a financial opportunity which may have been overlooked in the past.

A small-scale firewood business has never been a "get rich" venture. In fact, producing firewood is a very labor intensive operation. However, during the fall and winter months, it can provide extra income for farm families. In Illinois, farm woodland properties average approximately 21 acres in size (Iverson, 1989). Based on current growth rates, Illinois woodlands on an average site could support a harvest of 0.10 to 0.20 cords per acre per year. In fact, harvesting trees for firewood will help improve the health and vigor of most Illinois woodlands. Our private-owned woodlands are growing at one-fourth to one-third of their capable potential. Past cutting practices have left many unsalable trees that are crooked and diseased, and others which occupy too much valuable growing space. These large "wolf" trees suppress the growth of better quality trees and, in most cases, should be removed. Since they are of little to no value as a lumber crop, they make excellent candidates for firewood.

As in any other successful business venture, harvesting fuelwood requires a good plan. Many woodland owners who cut their own firewood or who allow others to harvest off their property for a fee give little thought to which trees should be removed and which ones should be favored for future growth. Often the better crop trees are removed because they have nice, straight trunks with few limbs. This makes cutting and splitting easier. However, in thirty seconds, you can easily undo what has taken a lifetime to create. Therefore, a real need exists to identify your woodland objectives prior to any cutting.

What benefits do you want from your woodland? Is growing a timber crop important? Do you favor watching or possibly hunting the wildlife that lives there? Do you want to see other types of wildlife in your woodland? Is it an important place where you walk to relax and enjoy the scenery? Do you want to grow timber, benefit wildlife, and observe wildflowers

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while continuing to earn an income from periodic harvests? These are questions only you can answer. Write them down, and seek professional assistance from your local Department of Conservation district forester or wildlife biologist, or a consulting forester.

Once the forester or wildlife biologist knows what you expect from your woodland, he or she can begin to help you develop a management plan to achieve your objectives. The next step will be an inventory of your woodland to see if your expectations are feasible. Just like agricultural land, some woodlands are more productive than others. This is a reflection of the site. Good, fertile sites will support many different tree species. Poor sites tend to be extremely limited in species variability. You may find that on a poor site a forester may recommend the woodland's highest and best use is for firewood.

The inventory will identify what tree species you have growing in the woodland, their relative number and size, and their condition. The inventory will reflect the opportunity for a harvest. If maintaining good wildlife habitat is important to you, the inventory will also identify den trees and snags, estimate mast production, and survey the understory tree species, shrubs, and herbaceous vegetation for browse potential. If firewood and wildlife are two of your objectives, you'll need to identify which trees benefit wildlife and which can be removed with little to no effect on their food or habitat requirements. Often large wolf trees are valuable hard or soft mast producers and may have cavities serving as active dens. Professional assistance can help you identify how many trees of this type you need to leave grow and which ones can be removed for firewood.

Unless you have a tree plantation which was planted specifically for fuelwood production, most firewood harvesting will be done on a periodic basis throughout your woodland. Often, it will coincide with a timber (sawlog) harvest. The larger limbs and tops provide an excellent source of firewood.

Following the harvest, timber stand improvement (TSI) may be necessary to ensure the regeneration of desirable species. Trees removed in TSI operations include wolf and cull trees left by loggers, or trees with no commercial importance. Smaller trees which sustained heavy damage during logging should also be removed. Often these trees are poisoned with a herbicide and are left standing. They pose no threat to younger trees competing for valuable sunlight, water, and nutrients. These trees provide an excellent opportunity for a fuelwood harvest.

Your forester or wildlife biologist may recommend that a few of these trees be poisoned or girdled with a chain saw and left to stand for wildlife. As they weather and decay, they become excellent den trees. Many will break apart leaving much-valued snags.

You may have a woodlot which is relatively young in its life where most of the trees are between 5 and 10 inches in diameter. These young pole stands are often in need of thinning and respond rapidly to increased growing space. Thinnings from this type of stand are particularly valuable for firewood since little splitting needs to be done.

A forester's help is very important if you have a young stand. He or she can help you identify the crop trees (refer to our previous issue of IFM) which will be carried to final harvest. Periodically, you will remove trees around the crop tree which compete with it. In younger stands, these pre-commercial thinnings are valuable firewood sources. As the trees grow in size, they become more valuable as a sawlog product. This generally occurs as the trees reach 11-12 inches in diameter. Obviously, species and quality play a big role in the ability to market the tree. The important point to remember here is that trees entering the small sawlog class are your most productive trees. Their value increases dramatically as they grow in diameter. It would be financially irresponsible to cut firewood in this type of woodland without the help of a forester.

Firewood customers want "good quality" firewood. Good quality generally translates to oak, hickory, and maple. True wood heat enthusiasts will burn what's available, but paying customers usually want their money's worth. Wood is normally sold by the cord or some fraction thereof. A standard cord is a stack of wood occupying 128 cubic feet. Generally, it's 4' x 8' x 4', but can be any size which equals 128 cubic feet. Other terms such as facecord, rick, stack, pile, truckload, etc. are a percentage of a standard cord. The amount of wood purchased in these units depends on the size of the individual pieces. Most homeowners like their firewood in 12-16 inch lengths. Wood this size stacked in a pile 4' x 8' is commonly known as a facecord or rick. Pieces 12 inches in length would yield one-fourth of a standard cord. Sixteen inch lengths would equal one-third of a standard cord. So one can see that the volume of

wood varies and the consumer should know what percentage of a standard cord is being purchased. A full-size pickup truck loaded to the top of the bed will normally hold from one-third to one-half cord depending on whether the wood's thrown in or stacked.

All species of wood have the same heating value per pound, roughly 8600 BTU's per pound minus any moisture. Wood allowed to air dry for six to nine months will contain approximately 20-25 percent moisture and yield roughly 7000 BTU's of heat per pound. The difference in heating value between species, assuming an equal volume (cord, facecord, etc.) of wood and moisture content, is reflected in the woods' densities. Very dense woods such as hickory, beech, and apple weigh more than cottonwood, sycamore, or elm, and therefore, have more heat value per cord (piece). Obviously, the price you charge for wood should reflect the species you sell. Refer to the chart below for information on the heating value of different Illinois woodland species.

Chart 1. Heating Values of Common Illinois Woods
High (34-23 million BTU/cord) Osage Orange (hedge), Black Locust, Shagbark Hickory, Persimmon, Ironwood, Dogwood, Honeylocust, White Oak, Blue Beech, Red Oak, White Ash, Sugar Maple
Medium (22-18 million BTU/cord) Walnut, Southern Pine, Hackberry, Red and American Elm, Black Cherry, Sycamore, Blackgum, Red Pine, Silver Maple, Jack Pine
Low (17-13 million BTU/cord) Sassafras, Yellow-poplar, Catalpa, White Pine, Cottonwood, Butternut, Black Willow, Buckeye, Basswood

Sources:

Burde, John H. and Dwight R. McCurdy 1984. **Wood For Energy in Illinois; 1982-83.** Southern Illinois University Department of Forestry Technical Report. Carbondale, 1984.

Iverson, Louis R., et.al. 1989. **Forest Resources of Illinois: An Atlas and Analysis of Spatial and Temporal Trends.** Illinois Natural History Survey Special Publication 11. Champaign, 1989.

For more information on firewood production, we suggest the following publications:

Van Ryn, Debbie and James Lassoie 1987. **Managing Small Woodlands for Firewood.** Cornell Cooperative Extension Service Information Bulletin 208. NYS College of Agriculture and Life Sciences. Cornell Univ., Ithaca.

Frick, George P. 1978. **The Firewood Producer's Manual.** Berkshire-Franklin R.C.& D. Area and Massachusetts Tree Farm Committee, Sunderland, MA.

Lancaster, Kenneth F. 1980. **Managing Young Stands for Firewood.** USDA Forest Service, Northeastern Area State and Private Forestry, Washington, D.C.

Folkema, Michael P. 1984. **Handbook on High-Capacity Production & Marketing of Fuelwood.** Forest Engineering Research Institute of Canada Handbook No. 6. FERIC, Vancouver, B.C.

Chain Saws: Consumer Information Guide, 1980. U.S. Consumer Product Safety Commission, Washington, D.C. 20207.

Gerling, J.F. and M.R. Craighead 1982. **Heating With Wood Series: Cutting Firewood Safely.** Oklahoma State University Cooperative Extension Service, Stillwater.

Bolgiano, C. 1986. "Selling Firewood: Pitfalls and Profits", **American Forests**, 92 (1986), 17-20.

WOOD 'N NICKELS

WOOD 'n NICKELS features articles related to the economics of owning a woodlot. Periodically, we will

feature articles that address woodland tax situations. We want to caution landowners that any information presented in this column is for general education purposes only and is in no way intended to substitute for legal advice. Such advice, whether general or applied to specific situations, should be obtained by consulting the Internal Revenue Service or your tax counsel.

This issue features an article by Dr. Keith Smith, Assistant Professor of Accounting at Arkansas State University, entitled "Dollars and Sense - Tax Planning for Timberland Owners." The article appeared in the September, 1989 issue of **Practical Forestry** and is reprinted with permission.

Dollars and Sense - Tax Planning for Timberland Owners

The current tax laws are not as favorable as they once were for the sale of timber because capital gain treatment is no longer available. However, individual timberland owners must operate within the current laws. The purpose of this article is to point out certain basic tax provisions that can be used to minimize the tax liability of timberland owners.

The current tax rates, or brackets, are 15 percent and 28 percent with a 5 percent surtax for high income individuals, making a 33 percent bracket for particular ranges of income (Hoffman, Willis and Smith, 1989, p. A-9). There is a major difference between "gross income" and "taxable income." Gross income is defined in Sec. 61(a) of the Internal Revenue Code as follows: "Except as otherwise provided in this subtitle gross income means all income from whatever source derived: (Prentice-Hall Federal Tax Service, Par. 7012). A variety of deductions is made available by the law which reduces the taxpayer's gross income to taxable income, the amount on which the tax is figured. The following table indicates the level which taxable income must reach before the extra taxable income for the sale of timber would be taxed at 28 percent.

Since individual timberland owners would be cash basis taxpayers, spreading the payments for the timber over more than one year might yield two possible benefits. An example of this would involve the sale of $10,000 of timber with the timberland owner receiving $5,000 down on December 15, 1989, and the remaining $5,000 later, say on February 15, 1990. The spreading out of the payments would make $5,000 includible in income each year of the two-year period. One possible benefit could be delayed payment of the tax. Assuming the $5,000 was fully taxable each year and the individual was in the 28 percent tax bracket, a $1,400 payment ($5,000 x .28) would be delayed for one year.

Taxable Income Where Tax Rate Changes from 15% to 28%

Filing Status	Taxable Income Over
Single	$18,550
Married Filing Jointly	30,950
Head of Household	24,850
Married Filing Separately	15,475

A second possible benefit would be obtained if the splitting of the income could lower the tax bracket. For illustration purposes, assume a single individual with taxable income of $13,550 after all deductions are taken, but before including any income from the sale of the timber. If the timberland owner sold $10,000 worth of timber, his taxable income would increase to $23,550. By referring to the taxable income table, it can be determined that $5,000 of the increase would be taxed at 28 percent. By splitting the sale of the timberland between two years and assuming the same taxable income before the sale of the timber, the taxable income would increase to $18,550 each year. This would result in the $5,000 being taxed at 15 percent each year, saving approximately $650 in taxes ($5,000 x .13 (old rate of 28 percent minus new rate of 15 percent)).

To further illustrate, assume a married couple with no children filing a joint tax return. The standard deduction automatically available to them for 1989 is $5,200. Individuals would want to itemize if their deductions were greater than the standard deduction. For illustration purposes, we will assume in all cases the standard deduction is larger. The couple would also have available a personal exemption of $2,000 each for a total of $4,000. These two deductions would reduce their taxable income by $9,200 ($5,000 + $4,000) and save the tax on that amount.

The tax laws also allow an extra $600 in standard deduction if the individual is 65 or older and married, or an extra $750 in standard deduction if the individual is 65 or older and single. If the married couple were both 65 or older the two deductions would reduce their taxable income by $10,400 ($6,400 + $4,000) (Commerce Clearing House, 1989, pp. 81-84).

These automatic deductions can provide excellent tax planning opportunities for the retired or semi-retired timberland owner. For illustration purposes, we will assume a retired couple, age 65, receiving Social Security benefits totaling $8,000 and a monthly pension of $200 ($2,400 annually). It is further assumed that the couple has 300 acres of timberland ready for a selection cut, with a value of $200 per acre for the timber to be removed. The tax results of three possible situations will be shown, although these do not represent all of the options.

In Situation 1, the timber from all 300 acres is sold and the money is received in the current year.

Situation 1–

Gross Income	
Sale of Timber	$60,000
(300 acres @ $200 per acre)	
Pension	2,400
Social Security Benefits*	4,000
	66,400
Standard Deduction	(6,400)
Personal Exemption	(4,000)
Taxable Income	$56,000
Tax Liability on $56,000	
@ 15%	$4,642.50
@ 28%	7,014.00
Total Tax Due	$11,656.50

**Income would be large enough to make 50% of the Social Security benefits subject to tax.*

In Situation 2, the timber from all 300 acres is sold and half of the money is received in the current year and half after completion of the cutting in the following year. Assuming the same tax rate for both 1989 and 1990, the following tax liability would result.

Situation 2–

	1989		1990
Gross Income			
Sale of Timber	$30,000		$30,000
Pension	2,400		2,400
Social Security Benefits	2,200		2,200
	34,600		34,600
Standard Deduction	(6,400)		(6,400)
Personal Exemption	(4,000)		(4,000)
Taxable Income	$24,200		$24,200
@ 15%	$3,630		$3,630
Total Tax Due		$7,260	

The tax savings of Situation 2 over Situation 1 would be $4,396.50. This is the result of no income being taxed at the 28 percent rate and the fact that with the lower gross income in each of the years not as much of the Social Security benefits would be subject to tax. We now move the Situation 3, which may provide even greater tax savings.

Situation 3–

	1989	1990
Gross Income		
Sale of Timber	$10,000	$10,000
Pension	2,400	2,400
Social Security Benefits	-0-	-0-
	12,400	12,400
Standard Deduction	(6,400)	(6,400)
Personal Exemption	(4,000)	(4,000)
Taxable Income	$2,000	$2,000
Tax Liability on $2,000 @15%	$ 300	$ 300

In Situation 3, the timber from 50 acres was sold during the current year with 50 acres to be sold during 1990. Again, assuming the same tax rate for both 1989 and 1990, the following tax consequences would result.

The sale of only 50 acres each year would result in tax of only $300 per year (3 percent of $10,000 sale price). By spreading the sale of the remaining timber over four more years, it might be possible (assuming minimum changes in the tax laws) to pay less than $2,000 (6 years x $300 = $1,800) in taxes. The disadvantage is delayed receipt of income, but it might be possible to save over $5,000 in taxes compared to Situation 2 ($7,260 - $2,000 estimated).

An individual's tax planning should be done considering his personal circumstances, but both Situation 2 and 3 illustrate the benefits of tax planning. It is important to note that tax planning must be done before year end. Remember that once the year is over, tax planning for that year is over and the individual must work with the existing facts, with certain limited exceptions such as an IRA contribution.

Before any decision about selling the timber is made, the timberland owner needs to know the value. An appraisal by a forester-appraiser would provide the basis for making a knowledgeable decision (Sizemore, 1989, pp. 8-9).

The retired or semi-retired couple in our illustration may not desire to sell the timber for themselves, but may wish to use it to benefit their children. Again, we will make certain assumptions for illustration purposes. In this case we will assume three grown children, all married. The couple could give the timber rights to the children in one year with no tax consequences from the gift. This is possible because there is an annual $10,000 exclusion for gifts for each donee or recipient. Only taxable gifts are subject to the gift tax. Since the gift would only be subject to the gift tax if the fair market value of the timber on the date of the gift exceeded the annual exclusion of $10,000 per donee, the couple could give $10,000 worth of timber to each married child and his or her spouse, thereby transferring the total $60,000 of timber present. Once the timber was sold by the children, they would have to pay the tax on the sale. The children will have the same cost basis in the timber as their parents, even though they received it as a gift. It is possible to give even more because a special election applicable to married persons allows gift splitting, which in effect permits the couple to give $20,000 per donee with $10,000 considered to be given by the husband and $10,000 by the wife. In our example, this would allow the gifts to total $120,000 before being subject to the gift tax.

In Situation 3, if the sale were spread out over six years, the parents could sell the timber for $10,000 per year, pay the $300 tax, give $3,000 to each child, and keep $700 for themselves. In this case, the $3,000 received by the children would not be subject to any further tax. This option would allow the parents to determine annually whether they need the money to meet their own needs or whether they want to pass the money on to their children.

Another tax planning option might be available to the tree farmer who has other farming interests. If the other farming interests are generating a loss, the tree farmer could sell some of his timber near the end of the year and as a cash basis individual collect the money. This timber income would offset the farming loss, leaving the farmer with no tax liability. An appraisal by a forester-appraiser would again be called for.

These tax planning tips and ideas are by no means all that is available. These may suggest other tips and ideas that may depend upon the individual's own unique situation. Even without the capital-gain exclusion, tax liability can still be reduced. Individuals might want to work with a CPA or other tax planner to develop an appropriate tax plan.

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EDITOR'S NOTE: We appreciate **Practical Forestry** magazine's willingness to let us reprint Dr. Smith's article. **Practical Forestry** is a new magazine written specifically for woodland owners. The full-color magazine advocates multiple use management of woodlands and features articles on wildlife, water, soil, recreation, and timber production to name just a

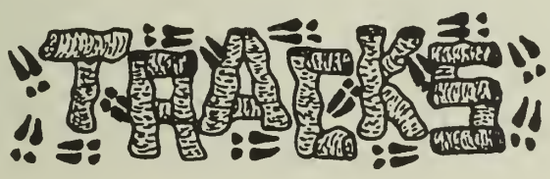
few. If you're interested in subscribing to **Practical Forestry** send your name, address and payment to: Practical Forestry, Inc., P.O. Box 482, Lexington, TN 38351. The subscription rates are $15, $28, or $39 for one, two, or three years.

***** ANNOUNCING *****

ILLINOIS TIMBER TAX WORKSHOP
January 30, 1990

10:00 a.m.-12:00 & 1:30 p.m-5:00 p.m.

If you own woodland property, sold timber in 1989, or participate in the forestry option of the Conservation Reserve Program, this workshop will help answer questions you or your tax adviser may have about preparing your 1989 Federal Income Tax. The workshop will be conducted by nationally-known forestry tax experts and will be presented within a short driving distance of your home. For more information or to register for the workshop, call your local county Cooperative Extension Service office. Pre-registration is required. The cost is $25.00.



TRACKS features articles on small game and non-game management for woodland owners. If you have a particular question you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

The following article is reprinted with permission from **Guidelines for Increasing Wildlife on Farms and Ranches** a publication produced by the Great Plains Agricultural Council Wildlife Resources Committee, and the Kansas State University Cooperative Extension Service. While the article makes reference to states in the Great Plains, the concepts are applicable to Illinois.

Wildlife Habitat of Small Woodlands and Woodland Borders in the Great Plains

by Gerald F. Bratton, Area Extension Forester, Kansas State and Extension Forestry

Wildlife is a natural part of Great Plains woodlands. It belongs there just as the trees themselves, the duff on the woodland floor, and the rich soil beneath the trees. Because of the wildlife, the woodland is a better place. It's more productive, more useful and more attractive.

Throughout the Great Plains there are islands and rivers of woodland that have excellent potential for both timber production and wildlife habitat. If the proper management program is initiated, techniques designed to grow good timber also will provide, even enhance, wildlife habitat.

It would be nice if we could involve all woodland wildlife in this section, but lack of research information and space necessitates that we concentrate primarily on game birds and animals and their habitat improvement. However, much of the effort to improve wild game habitat will also have a positive influence on many non-game species.

Habitat-Basic Needs

The basic need of wildlife is suitable habitat, one that will carry all the animals through the entire year and will vary with the species and their individual preferences for food (whether browse, grass, fruits, nuts, insects, or other animals) and their cover needs (whether den trees, thickets, brush, grass or weeds). Food, cover, water and living space are necessary for wildlife to exist. No single habitat need can be considered more important than the other. All must be managed as a conglomerate in order to facilitate wildlife.

Variety is the name of the game. The more variety we can manage in terms of food, cover and space, the more variety of wildlife we can attract.

Food variety, quality and quantity must be adequate to meet the material needs of the different kinds of wildlife. Food sources to consider must include insects and other animals as well as the trees, grasses, weeds, forbs, shrubs and vines.

In considering cover we also need to aim for variety. Wildlife, in general, needs nesting cover and rearing cover, roosting cover, escape cover, winter or protection cover, loafing areas and travel lanes. Many of our wildlife species are rarely found deep in the woodland so it becomes necessary that we mention the "edge effect". Edge refers to the borders where different types of cover meet. For example, where grassland meets forest, an edge is created. The "edge" is extensively used by wild game species and is important to good habitat management. In general, the more edge created the larger the population of game birds and animals that will be present.

Forest-Habitat Management

There are five major forestry projects utilized in order to effectively manage a woodland for both forest crops and wildlife: 1) Timber Harvest; 2) Timber Stand Improvement; 3) Planting; 4) Woodland Border Development; and 5) Protection.

Timber Harvest not only allows the owner to reap a monetary value from woodland, it's also a tool to improve habitat. By cutting trees for logs, posts, firewood or other products we thin the trees and create openings in the canopy. These openings create a "mini-edge" effect and allow sunlight to reach the floor stimulating understory growth. This helps keep a constant supply of timber growing and at the same time regenerates wildlife food and cover.

There are several methods of harvesting trees to aid wildlife. Probably the best method is a selective harvest where we remove single trees that are mature or near mature. This method allows the degree that we remove trees to be easily regulated. The group selection method removes several trees in the same location. Where feasible, use of the group selection method will create larger openings and benefit more wildlife. Other less desirable methods will include clearcutting (unless cuts are made in narrow strips or small irregular blocks), or other more drastic removal methods. When harvesting timber it's important to remember to leave den trees, standing dead trees and food trees, shrubs and vines. Den trees with south facing entrance holes seem to be more beneficial. Food species to favor might include mulberry, oaks, hickory, pecan, walnut, hackberry, paw paw, dogwood, persimmon, green-briar, wild grape, virginia creeper, etc. There are, of course, too many different plants to list them all.

Timber Stand Improvement, labeled TSI, is a forestry practice of removing trees in order to increase the growth rate of future crop trees and/or improve their quality. This practice is used to thin out trees whose growth is being restricted by less desirable trees. During the above operation, it is usually beneficial to prune the trees and kill vines that are damaging high value crop trees. Leave vines that are not causing problems.

If a TSI project is undertaken with only wood fiber production in mind, it may be detrimental to wildlife in the area. With a little "give and take" both timber and wildlife can benefit. Try to incorporate the following tips:

1. Leave the proper number of den trees (1-3 per acre is usually adequate).

2. Don't remove standing dead trees (they aren't competing with crop trees).

3. Kill as many cull trees as possible by girdling them and leaving them stand (the only exception to this might be if a serious outbreak of undesirable insects might result).

4. Do not chemically treat stumps (beneficial browse and low level cover may sprout from them).

5. Kill only vines that are damaging future high quality crop trees.

6. Leave or even thin around food trees such as mulberry, oaks, persimmon, walnut, hickory, hackberry, dogwood, paw paw, etc.

7. Concentrate the thinning residue in loosely-stacked brush piles. Incorporate as much large material (a minimum of 5 inches in diameter and 5 feet long) as possible to increase the useful life of the brush pile. Construct the piles approximately 4-5 feet high and 10-15 feet in diameter. It's better to build the brush piles near the woodland's edge.

8. Where the woodland contains no desirable trees, clearcut small areas to create woodland openings.

9. Remember to retain buffer strips along creek channels. Leave all trees and shrubs for at least 20 feet in order to protect the bank from erosion and enhance fisheries.

New Plantings can improve both timber and habitat. Quite often we neglect to replant areas that have been harvested and don't contain the proper species of trees for good timber production or wildlife habitat. A decision may need to be made whether or not to maintain forest openings and keep them from growing back to forest or allow them to return to forest. This will need to be an "on site" decision based on the need for increased timber production or woodland openings for wildlife benefit. Of course, planting the proper trees can benefit both wildlife and timber. For example, in a stand of timber that is in need of mast production it could be beneficial to replant forest openings with an oak species. Remember to plant trees and shrubs that can tolerate shade in small openings, less than an acre or two in size.

Many farms contain odd areas or idle acres (unproductive small acreages of farm land) unsuited for crop production due to flooding or are acreages too small to farm efficiently. These areas lend themselves well to planting forest crops. If properly planned, these plantings can also benefit wildlife. When planting these areas to forest crops, we can benefit wildlife by planting an occasional food producing tree of the species previously mentioned, and also add some wildlife-benefiting shrubs. For example, in a walnut plantation, we could benefit wildlife by planting 4-5 red oak trees per acre and include some autumn olive shrubs between trees in the tree rows. **EDITOR'S NOTE: Plan carefully. You would not want to encourage wildlife to move in and browse on your walnut trees.**

New planting can also be utilized to tie small woodlands together and create travel lanes (protective cover for wildlife travel) between woodlands or from the woodland to water. A good tree and shrub mixture might be best suited for travel lane plantings.

Development of **Woodland Borders** can be a very rewarding habitat improvement project. Once again, we can create the much needed diversity and edge and increase the number of wild creatures. A simple method of creating good woodland borders would be to cut the trees within 20 or 30 feet of the woodland edge. If the proper shrubs are present they will be released. If not, shrubs, grasses and legumes can be planted. An added benefit will be increased crop production near the woodland border. If the owner is willing, it is also beneficial to leave 2 to 5 rows of unharvested crops adjacent to woodland borders. Crops that benefit wildlife the most include corn, soybeans, and milo.

Keep in mind that the woodland borders are also the best areas to build the brush piles discussed in the harvesting and timber improvement sections of this article.

A good **Forest Protection** program is essential to good forest and wildlife management. Grazing by domestic livestock can be one of the worst offenders of a good forest-wildlife program. If you can do nothing else, your number one management tool is a good fence to control grazing in your woodland. Grazing not only destroys habitat, it damages forest production. The fence is your number one wildlife tool!

Protection from uncontrolled wildfire is also a must. Too many land managers are burning their woodland to improve habitat. They do so at the expense of the forest. In most instances, a logging operation or a thinning project can obtain the same results without doing irreparable damage to the trees in the forest. Developing a maintained firebreak around the woodland edge is recommended. The firebreak is especially important where woodland is adjacent to highly flammable areas such as a grassland, roadside, etc. If the woodland is 40 acres or larger, a firebreak through the woodland center might also be considered. An access road or old logging road makes an excellent firebreak when either kept clean of vegetation or planted to a cool season grass and kept mowed.

The woodland should also be checked periodically for disease or insect problems. If you suspect a problem, contact your local district forester, extension office, or SCS/SWCD office for assistance.

Today's agricultural programs rely on many different chemicals that are foreign to nature. Many trees and shrubs are very susceptible to injury or death from chemical misuse. Make certain to control drift of phenoxy herbicides. These chemicals can erase a century of management effort in a few short minutes if not properly used.

Rules for Woodland Wildlife Management

Stated simply, the rules for the management of woodland and wildlife are: Protect the woodland from uncontrolled fire and grazing, cut the trees selectively, preserve den and food trees, and develop woodland borders. To accomplish these management rules landowners must:

1. Build a firebreak around and through the woodland, and use fire with caution.

2. Restrict grazing. Fence the woodland where practical.

3. Harvest trees selectively--group selection is probably the better method.

4. Develop woodland border transition areas (20-30 feet wide) by cutting trees and encouraging shrubs, grasses and legumes.

5. Establish wildlife travel lanes between woodlots and to watering places.

6. Leave creek bank buffer zones when harvesting timber or doing timber improvement work. Cut no trees within 20-30 feet of a creek.

7. Where needed, plant food-producing trees in woodland openings and/or maintain openings, whichever best benefits your objectives.

8. When harvesting or improving woodland, leave food producing trees, den trees, standing dead trees and roost trees.

9. When establishing a new forest by tree planting, be sure to include trees and shrubs that produce food and cover. Avoid large stands of only one tree species.

10. When improving the woodland, kill cull trees and leave them stand. If trees are severed from the stump, do not chemically treat the stump. Allow it to sprout.

11. Use harvest or TSI residue to build brush piles near the woodland's edge.

12. When possible, leave 2 to 5 rows of unharvested row crops for winter feed near the woodland's border.

13. Thin your timber every 5 to 8 years to increase growth and improve habitat. This should be done under the direction of a forester or wildlife biologist.

14. Keep variety in the woodland--the more variety, the more wildlife.

15. Have a good plan before starting.

Setting the Stage by Planning

There are two preliminary steps that should be completed before a final plan can be initiated. First, the owner should line out personal objectives. What type of game do you want to attract? Do you want to hunt? How much income should the woodland generate? These types of questions need to be answered before approaching a professional for help or prior to designing your plan.

The second consideration should be an inventory of both timber and wildlife habitat in order to see what needs to be done to meet your objectives or to see if the objectives are attainable. Is commercial timber in the woodland? Is the woodland the size to attract and support the type of wildlife desired? Are the proper food and cover plants available and in the proper quantity? Is water available? What is the age and condition of the trees in the woodlot?

The answers to these questions may be difficult for the average land manager to obtain. In order to develop the plan, it might be best to contact both a professional forester and a wildlife biologist for assistance. In combination, they will be able to answer many of the technical questions needed to "set the stage" for management projects.

Once the plan is completed it should include:

1. Your objectives.

2. An inventory of plants and wildlife present.

3. A list of plant materials needed to enhance wildlife and a procedure for planting and maintaining them.

4. Methods of harvesting timber, and a procedure for timber improvement to enhance wildlife habitat and your forest's productivity.

5. A protection program outlining how the woodland will be protected from fire, destructive grazing, pests, etc.

Many kinds of wildlife that live in woodlands are found nowhere else. When a woodland is harmed or destroyed, these creatures become fewer and disappear. Proper woodland management can not only give the owner a monetary return, but also benefit wildlife. Both are attainable goals.

Reprinted with permission from: Guidelines for Increasing Wildlife on Farms and Ranches. Great Plains Agricultural Council Wildlife Resources Committee and Cooperative Extension Service, Kansas State University - Manhattan; April 1988.

EDITOR'S NOTE: This publication is a compilation of over 600 pages of useful information on wildlife habitat management around the farm. A copy can be obtain by sending a **$27.00 check** payable to Kansas State University to: **Wildlife Habitat Handbook, 118 Umberger Hall, Kansas State University, Manhattan, Kansas 66506.**

JUDGING YOUR ACORN POTENTIAL

Abundance of oak acorns is one of the most important factors affecting the suitability of mixed oak woodlands for deer, turkey, and squirrels. Here is a way to judge your woodland's potential for producing acorns for wildlife.

1. Pick a few areas that seem to be representative of your woods and mark off one-quarter acre plots. A circle about 59 feet in radius (118 feet in diameter) will do.

2. Count all oaks 10 inches DBH (diameter at 4.5 feet above the ground) or larger inside the plots. These trees are your best producers. Separate your counts into 2-inch diameter classes (10, 12, 14, etc.).

3. Calculate basal area (BA--a measurement of the woodland's level of stocking) of each diameter class using the figures listed in Table 1. For example, if you have six oaks that are 12 inches DBH, multiply 6 by 0.79; (6 x 0.79 = 4.7).

4. Add all the basal areas together and multiply by 4 so your one-quarter acre plot represents an acre.

Table 1. Basal area of trees by 2 inch diameter classes

DBH	Basal Area
10"	0.55
12"	0.79
14"	1.07
16"	1.40
18"	1.77
20"	2.18
22"	2.64

Acorn Index

The acorn potential index presented in Table 2 is based on a top score of 100.

Table 2. Acorn Potential Index

Basal Area Score	Acorn Potential
Below 40	Poor
40 - 60	Fair
60 - 80	Good
80 - 100	Excellent
Over 100	Excellent, may need thinning

If your condition is rated fair or poor but you have many oaks smaller than 10 inches DBH, just wait and give them time to grow. This method can be simplified by a forester using a BAF 10 or 20 prism and calculating BA/acre of all oaks greater than 10 inches DBH.

It is also important to have different oak species represented in your woodlot. Red oaks and white oaks vary from year to year in their production rates. Species diversity helps insure adequate acorn production during most years.

SOURCE: Pennsylvania Woodland News, Vol.3, No.5 September/October, 1989.

SilvaScene

The Illinois Cooperative Extension Service has identified six program issues for major focus in the next five to ten years. These issues include: agricultural profitability and sustainability; family well-being; food, nutrition and wellness; environmental quality; community development/rural revitalization; and leadership development. Forestry and the use of tree cover will play a major role in two of these issues; agricultural profitability and sustainability, and environmental quality. The agricultural profitability and sustainability issue places emphasis on cost-effective technology and management strategies. The farm woodlot has long been an "overlooked" and often neglected resource. Many farm families are beginning to realize that their woodlot has attractive financial implications, and is a renewable resource

which can support a sustained income-producing crop with minimal input.

The environmental quality issue relates to the concern for the environment including problems of soil erosion, ground waters and surface water contamination, and global warming. Trees and forest ecosystems play a vital role in controlling erosion, and improving the quality of the water we drink and the air we breathe. The following article emphasizes the important role trees play in controlling soil erosion and enhancing the environment. It was written by a Minnesota forester who's considered a leader in shelterbelt and windbreak technology. Illinois has lost most of its field shelterbelts to the plow. It's time we re-discover their benefits once so revered.

FIELD WINDBREAKS TEMPER EFFECTS OF DROUGHT

by Harold Scholten, Extension Forester, Department of Forest Resources, Minnesota Extension Service.

The United States was not aware of the seriousness of soil loss through wind erosion until the first great dust storm on May 12, 1934, known as the Dust Bowl. The storm originated in western Kansas, Texas, Oklahoma, and eastern Colorado, and swept across the U.S. in a north and easterly direction for hundreds of miles over the Atlantic, carrying an estimated 200 million tons of soil, reaching heights of almost 2 miles.

Dust settled in Canada, blocked out the sun over our nation's capital, and sifted through windows and screens of homes and office buildings across the country. Some farms lost topsoil to plow depth. The blowing soil particles cut off crop plants at the soil line.

The catastrophic proportions of crop destruction and loss of the productive potential of farmland that followed the 1934 Dust Bowl had a pronounced effect nationwide. Farmers who witnessed the destruction of current crops and the overnight disappearance of fertile topsoil--the basic ingredient of future crops--knew that something had to be done at once to rebuild the land and prevent any future topsoil loss. The public, too, quickly realized that the farmers' crop loss was its loss--lost food products to the consumer. Individuals and organizations, with a common purpose, banded together to protect the nation's topsoil. Wide-scale tree plantings on the Great Plains began. These plantings were called shelterbelts or windbreaks. The early windbreaks were multi-row, often as many as 20 rows wide. Later research showed that single-row windbreaks were just as effective.

Some Farmers Tend to Forget Past Droughts and Dust Storms

Not long after the great Dust Bowl, subsequent rains replenished the soil moisture. Since the dust had settled, crops once more flourished. People became complacent--the lesson that should have been learned from the Dust Bowl was soon forgotten. This complacency and the pressure on farmers immediately after World War II to produce more food to feed the world resulted in breaking new land for crop production. To help the farmer produce more food, farm equipment manufacturers increased the size of farm equipment. Some farmers, in their desire for expanded cropland to accommodate the large farm equipment, began to look on field windbreaks as obstacles to the efficient operation of this machinery. These farmers removed their windbreaks --windbreaks that probably contributed to their favorable crop years. The importance of the windbreak seemed to be forgotten.

During the mid-1950s, while farming operations were expanding, the U.S. experienced a period of drought with accompanying dust storms reminiscent of the Dust Bowl. Farmers again realized the importance of their topsoil, and many renewed their interest in soil conservation practices, including field windbreaks. But, again, as periods of favorable weather conditions followed the drought, interest in protecting precious topsoil began to wane, and complacency set in. Then came the drought and dust storms of the mid-1970s, followed by another revitalized interest in soil conservation practices and windbreaks. But again subsequent favorable weather repeated this complacency in many farmers.

However, the droughts of the mid-1950s and mid-1970s did bring back memories in some older farmers of the 1934 Dust Bowl and younger farmers saw the effects on cropland of more recent periods of drought and dust storms. For these farmers, implementing conservation measures, including windbreaks, to keep the fertile topsoil in place and conserve soil moisture became their way of providing an inheritance for future generations. Unfortunately, too many farmers did not learn the lesson that nature tried to teach in recurring patterns of drought and dust storms. And now, once again in 1988 the U.S. is

reminded of nature's cycles--a period of drought accompanied by early spring winds blowing fertile topsoil off unprotected cropland and into roadside ditches.

Soil and Water Conservation Practices Necessary to Fight Drought

Will these lessons ever be learned? Maybe the drought of 1988 will finally teach more farmers and the public that, as stewards of the land, land is passed on from generation to generation. Although little can be done to reduce the damage of the 1988 drought and dust storms, something can be done about the drought and dust storms of the future.

We can control the effects of wind by reducing its capability to pick up soil particles and cause them to become airborne clouds of dust. How do we do this? By practicing appropriate conservation measures such as no-till, minimum till, ridge planting, strip cropping, and contour farming. To this we must add the important preventive measure--learned after the Dust Bowl of 1934 and to some measure after the droughts of the mid-1950s and mid-1970s--to reduce the velocity of the wind by planting grass strips and/or single-row tree windbreaks before the wind can cause soil loss and moisture depletion.

How Single-Row Tree Windbreaks Conserve Soil and Moisture

Well-designed, single-row field windbreaks conserve soil and water by intercepting and holding winter snowfalls; reducing or preventing topsoil loss by wind erosion; reducing evaporation and transpiration; reducing wind damage to crop leaves; and moderating soil and air temperatures.

A well-designed field windbreak will intercept snow and allow it to filter through the trees and spread uniformly over the protected cropland. On unprotected fields, snow (along with topsoil) will be swept off the fields and fill up roadside ditches. When uniform snow distribution melts, the result is a uniform recharge of soil moisture and a more uniform stand of crops. A winter cover could mean the difference between having a crop or not having a crop when the winter is followed by a period of drought such as that of 1988.

By reducing wind velocity, windbreaks will reduce or prevent the loss of fertile topsoil and in effect, conserve soil moisture. Topsoil contains organic matter that helps retain soil moisture. Blowing wind on unprotected fields will cause the fields to lose fertile topsoil and the blowing, drifting soil particles will cut off tender young crops by "sandblasting".

Field windbreaks reduce wind speed which, in turn, reduces the rate of water evaporation and transpiration from crop plants. One study has shown that evaporation rates on the protected side of a field windbreak was 60 percent less at 5H (5 times the windbreak height), 40 percent less a 10H, and 20 percent less at 20H. The reduction of wind velocity over sheltered crops protected by a field windbreak means that less water vapor from evaporation and transpiration of crop leaves is moved out of the protected zone. This means the humidity in protected fields is higher than in open fields; protected crops use less water and use it more efficiently than unprotected crops. Hot, drying winds over open fields deprive crops of moisture by excessively increasing the rate of evaporation and transpiration, blowing the resulting water vapor away from the crops.

By reducing wind velocity, windbreaks reduce wind damage to crop leaves. The leaves on protected crops are considerably less subject to tearing and ripping. Undamaged leaves are healthier, remain turgid longer during times of drought, use moisture more efficiently, and make more efficient use of solar energy in the process of photosynthesis when carbohydrates are produced for use by the plants.

The moderating effect of windbreaks on both air and soil temperatures is beneficial to crops, especially during droughts. Air temperatures near the ground in protected crops are usually a few degrees cooler on hot days and a few degrees warmer on cool days and nights compared with temperatures in open fields.

Windbreak Orientation Influences Windbreak Effects on Crops

Orientation of field windbreaks has an effect on crops by influencing snow distribution, shading, and soil erosion by wind. Most snow storms in Minnesota (Illinois) come from north of northwest. This means that an east-west oriented windbreak will do a better job of uniformly distributing snow on the leeward (south) side than a north-south oriented windbreak. Blowing, drifting snow approaches an east-west windbreak at a wider angle (more broadside), forcing more snow to filter through the windbreak

and spreading it over the field. Blowing, drifting snow approaches a north-south oriented windbreak at a narrower angle, reducing filtering and causing deeper snowdrifts near the windbreak on the leeward side. Orienting a windbreak to produce the most uniform snow distribution possible is essential in preparing for future droughts.

During hotter daylight hours, crops on the north side of an east-west windbreak will receive more shade during mid-day and early afternoon, while crops on the east side of a north-south windbreak will receive more shade during late afternoon and early evening. This is of some benefit to crops during droughts.

Although winds from any direction can cause dust storms under the right conditions, most dust storms are cause by south or west winds. So to prevent dust storms, a network of both east-west and north-south oriented windbreaks in necessary. Most of the early spring dust storms in 1988 were caused by south winds; consequently, little soil moved behind east-west oriented windbreaks, while clouds of dust blew along both sides of north-south oriented windbreaks.

Effect of Field Windbreaks on Crop Yields

Many studies in the U.S., Russia, and other countries have shown that field windbreaks have the greatest effect on increasing crop yields in protected fields during dry seasons when moisture is a limiting factor. During extreme drought as experienced in 1988, crop yields in protected fields will not be great, but the harvest might pay for the seed, while in open fields it may not pay to harvest. Yields should be uniformly higher in protected fields where field windbreaks did a good job of uniformly distributing the previous winter's snowfall over the field. In fields where the design of the field windbreak resulted in major snowdrifts adjacent to the windbreak on the leeward side, yields should be higher in the snowdrift area except for a few crop rows or a narrow strip in the shade or root-zone area of the windbreak trees. In fact, in this situation, during the growing season, the taller, healthier crops will outline the previous winter's snowdrift pattern. Crop yields beyond this snowdrift pattern may be lower.

The effect of field windbreaks on increasing crop yields is not as dramatic during seasons when moisture is not a limiting factor. However, a windbreak that adequately performs its many functions contributes to higher crop yields, compared to crop yields in open, unprotected fields.

Managing Field Windbreaks during Periods of Drought

Managing field windbreaks during drought is no different from managing them during so-called normal seasons except that young plantings should be watered because roots have not had time to grow to the depths of available moisture. A field windbreak designed and managed for uniform snow distribution should provide good overall protection and result in healthier crops, if not increased yields.

Designing New Field Windbreaks to Prepare for Future Droughts

Field windbreaks can be designed to adequately maximize beneficial functions to agricultural crops. Designing an individual windbreak to perform these functions, which have tempering effects in drought, requires proper orientation (usually east-west or north-south), proper choice of species, proper spacing, and for some species, pruning the lower crown.

If the drought lesson that nature has tried to teach us has been learned, we can do something now to prepare for the next cycle of drought and dust storms sure to come. We can plan to put into practice appropriate soil and water conservation measures which include planting field windbreaks. Also, we should consider planting a network of both east-west and north-south field windbreaks, especially on large fields, to prepare for winds from four directions. Such a network would have maximum effect on controlling soil erosion, reducing evaporation and transpiration, reducing wind damage to crop leaves, and intercepting and holding snow on the cropland. This would take some land out of production and might be inconvenient on some farms using today's large equipment. However, sacrificing a little land and a little convenience would be far better than sacrificing an entire crop every time a cycle of drought and blowing topsoil like that of 1988 hits. We have the means and knowledge to lessen the effects of future droughts. If we do not use this to our advantage, we have no one to blame but ourselves when the next drought occurs. Mother Nature is better tempered than blamed. And in tempering Mother Nature, consider planting a windbreak on your farmstead to protect it from blowing dust--the farm family and livestock also suffer from extreme droughts and blowing winds.

Source: Scholten, Harold 1988. **Field Windbreaks Temper Effects of Drought.** Minnesota Extension Service Publication AG-FO-3561, 1988.

EDITOR'S NOTE: In the next issue of our newsletter, we will present Mr. Scholten's recommendations on windbreak orientation, species selection, spacing, pruning, and management.

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ILLINOIS TIMBER PRICES

ILLINOIS DEPARTMENT OF CONSERVATION
life and land together

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600 North Grand Avenue West
Springfield, Illinois 62706
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November 21, 1989

PRICES PAID ILLINOIS TIMBER PRODUCERS MAY 1989 THROUGH AUGUST 1989

PRICE REPORTING ZONES

Summer sawtimber prices paid Illinois timber growers were generally higher than a year earlier for both stumpage and FOB. Of the timber buyers reporting volume of their 1989 operations, 43% indicated their volume was 500 thousand board feet or higher. This was unchanged from the 1988 percentage.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	May 1988-August 1988		November 1988-February 1989		May 1989-August 1989	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	130	266	118	271	136	268
Basswood	52	133	63	145	54	146
Beech	44	120	44	124	46	119
Cottonwood	33	111	41	118	41	118
Sweet Gum	39	121	47	125	42	122
Elm & Hackberry	37	117	47	127	45	122
Hickory	48	131	52	136	49	147
Soft Maple	45	126	54	135	53	146
Sugar Maple	56	130	58	150	64	142
Black Oak	102	164	101	159	96	176
Pin Oak	40	119	49	124	48	128
Red Oak	151	264	156	314	169	343
White Oak	133	237	137	289	164	335
Yellow Poplar	69	159	74	166	90	179
Sycamore	37	113	40	127	40	124
Black Walnut	318	530	326	512	288	515
Woods Run Bottomland	56	131	57	125	64	130
Woods Run Upland	102	189	99	140	109	163

FACE VENEER PRICES $ PER M BD. FT.

Red Oak	391	781	440	840	455	705
White Oak	872	1,335	851	1,525	819	1,321
Walnut	1,382	2,059	1,443	2,092	1,439	2,180

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	May 1988-August 1988		November 1988-February 1989		May 1989-August 1989	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	1.71	13.58	1.88	--	1.63	16.50

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	184	334	198	440	178	350

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
MAY 1989 - AUGUST 1989

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber				Dollars			
Ash	M bd. ft.	100 - 250	145 - 400	60 - 250	120 - 500	50 - 200	100 - 333
Basswood	M bd. ft.	60	135	30 - 60	120 - 200	30 - 100	200
Beech	M bd. ft.	30 - 60	90 - 145	30 - 80	100 - 130	30	--
Cottonwood	M bd. ft.	30 - 50	90 - 145	20 - 80	70 - 130	20 - 75	100 - 150
Sweet Gum	M bd. ft.	30 - 60	90 - 145	20 - 65	80 - 150	--	--
Elm & Hackberry	M bd. ft.	30 - 60	90 - 145	20 - 100	80 - 150	20 - 100	--
Hickory	M bd. ft.	20 - 80	130 - 200	25 - 100	80 - 200	20 - 80	100 - 200
Soft Maple	M bd. ft.	30 - 75	90 - 150	30 - 100	120 - 200	30 - 100	140 - 200
Sugar Maple	M bd. ft.	30 - 75	90 - 150	30 - 100	120 - 200	40 - 100	--
Black Oak	M bd. ft.	100	250	30 - 200	120 - 260	50 - 150	--
Pin Oak	M bd. ft.	30 - 50	90 - 145	20 - 100	120 - 150	30 - 50	--
Red Oak	M bd. ft.	150 - 250	240 - 450	50 - 300	140 - 500	50 - 300	200 - 550
White Oak	M bd. ft.	100 - 300	230 - 500	60 - 300	140 - 700	50 - 250	200 - 450
Yellow Poplar	M bd. ft.	50 - 140	140 - 280	50 - 150	90 - 200	--	--
Sycamore	M bd. ft.	30 - 60	90 - 145	20 - 80	120 - 150	20 - 60	100
Black Walnut	M bd. ft.	250 - 350	400 - 700	100 - 500	400 - 560	150 - 600	450 - 650
Woods Run Bottomland	M bd. ft.	50 - 175	120 - 170	35 - 100	110 - 120	30 - 60	120
Woods Run Upland	M bd. ft.	50 - 225	120 - 190	40 - 210	120 - 250	50 - 175	160

		STATEWIDE	
		Stumpage	F.O.B.
2. Face Veneer			
Red Oak	M bd. ft.	100 - 1,000	200 - 1,000
White Oak	M bd. ft.	400 - 1,500	800 - 2,000
Walnut	M bd. ft.	250 - 3,000	1,000 - 3,500
3. Pulpwood			
Unpeeled	Ton	1.00 - 2.00	13.00 - 20.00
4. Cooperage			
White Oak	M bd. ft.	90 - 300	300 - 400

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	96
Scribner	3
International	1

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	23	100 - 200
Zone 2	29	60 - 180
Zone 3	39	100 - 250
ILLINOIS	31	60 - 250

VOLUME OF 1989 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	23	33	29	29
100 - 500	15	26	34	28
500 - 1000	31	11	21	19
1000 - 3000	31	15	8	15
3000 +	0	15	8	9

Cooperage is the manufacture of barrels. Face veneer: Logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers.

MARKED TIMBER SALES - MAY 1989 - AUGUST 1989

	STATEWIDE STUMPAGE*
Woods Run Upland	$63 - $338/M bd. ft.
Woods Run Bottomland	$85 - $97/M bd. ft.

*Prices supplied to District Foresters by seller, may include some veneer.

Fred S. Barrett
State Statistician

Dean Hasenmyer, Garry D. Kepley,
Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 1, 1990 No. 18

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: **Editor, IFM Newsletter, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.**

This issue features a continuation of our article entitled "Alternative Income Opportunities From Private Woodlands".

MAPLE SYRUP PRODUCTION FROM SMALL WOODLOTS

Long before the first Europeans came to the United States, native Americans collected maple sap and produced maple sugar. The sugar was an important condiment and item of exchange, and continued to be of considerable economic importance to settlers in the north central and north eastern parts of the country. With the growth of the cane and beet sugar industries, maple sugar production has declined and maple products are now produced largely for their novelty, luxury, and historic interest. Our forebears probably would never have believed a generation of Americans could grow up without tasting REAL maple syrup.

Starting a small commercial production of maple syrup and maple sugar products would require a well-spaced, conveniently-located, and productive grove (or "sugar bush") of 200-500 mature sugar maples on one to ten acres, plus an investment of several thousand dollars in sap collecting equipment, evaporators, and packaging materials. However, syrup production does provide an opportunity for supplemental income to farmers with woodlots where maple is the predominate species. Information on commercial operations can be found in numerous publications listed at the end of this article.

If your goals and means are more modest, you can still enjoy homemade maple syrup derived from just a few trees in your woodland.

Tree Selection

Syrup is made from tree sap drawn from different maple species in late winter or early spring. Figure 1 shows the geographic distribution of hard maple trees and the range of commercial production of maple syrup. Thirteen species of maple are native to the United States and five of these species can be used for maple syrup production.

Figure 1. **A** - range of commercial production of maple syrup; **A&B** -range of hard maple trees.

In order of preference, these five species are:

Sugar maple (**Acer saccharum**)
Black maple (**A. nigrum**)
Red maple (**A. rubrum**)
Silver maple (**A. saccharinum**)
Box elder (**A. negundo**)

Sugar content in maple trees varies from as little as 1 percent to as high as 8 to 10 percent. Sugar maple and black maple are generally preferred for sap production because they have the highest sugar content. The other maples also have a tendency to

produce lower quantities of sap. Sugar maples in the Midwest have an average sugar content of 2 to 4 percent. The leaves of these trees are shown in Figure 2.

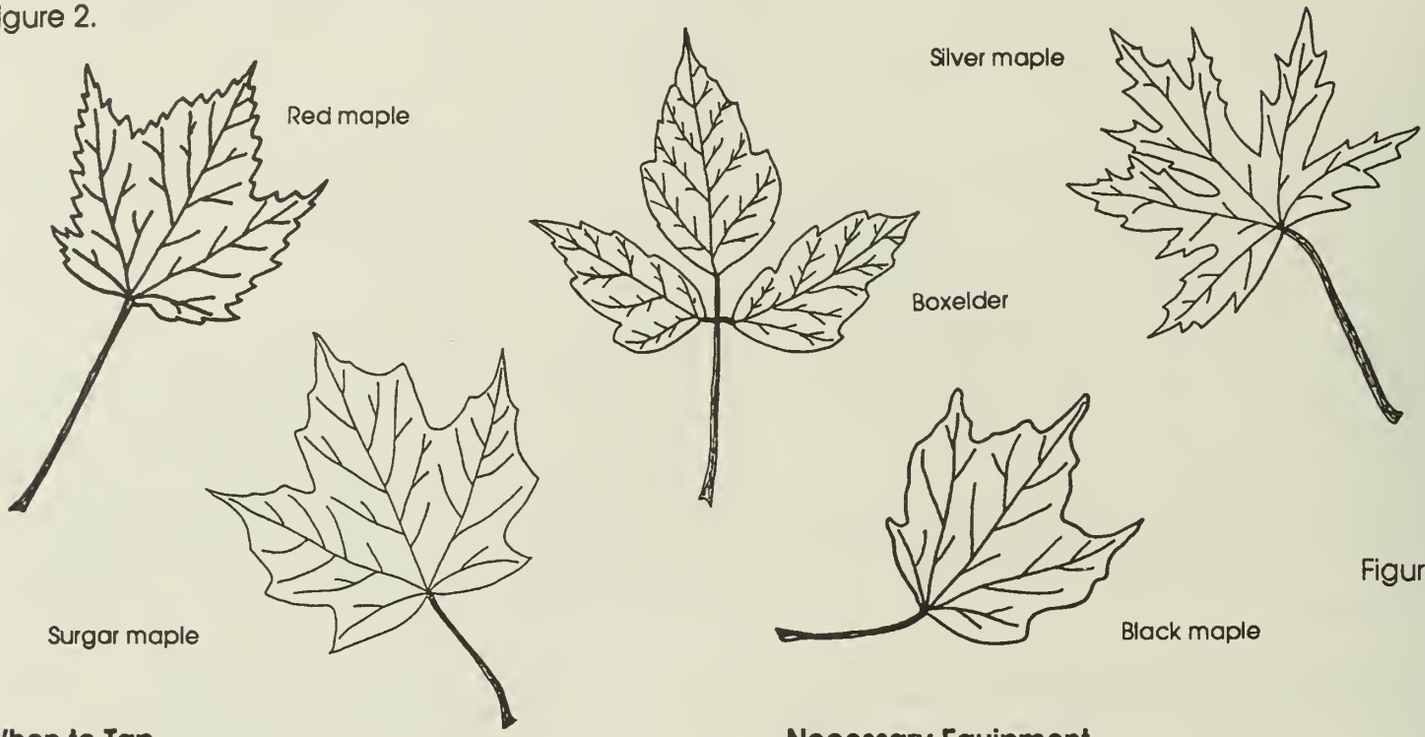

Figure 2.

When to Tap

Why sap flows in maples is still something of a mystery, but it is a well-known fact that the flow of sap is triggered by thawing days followed by freezing nights. For practical purposes, the sap flow or "run" from maple trees may be thought of in this way; during thaws, the tree warms up and gases and sap expand. When freezing temperatures occur, the wood cools off. The gases and sap contract, and the tree "pulls" liquid from the branches and roots into its trunk. During this time, sap will flow from any wound in the wood whether it is a hole bored in the tree or merely a broken twig.

Ideal tapping conditions occur after a wet winter on days with temperatures in the 40's to 50's following nights with temperatures in the 20's to low 30's. When conditions are good, a single tap hole may produce a gallon of sap per "run". Between periods of ideal weather, the sap may drop from a "run" to a "slow walk" and may stop entirely when temperatures are below 30 degrees or above 50 degrees F. The longer weather conditions hold in the spring, the more runs there will be and the more sap will be produced. The tapping season may last from one week to two months, but sap should not be drawn once the leaf buds begin to swell. Sap drawn this late in the season has a bitter taste described as "buddy". No harm can come from tapping trees a bit early. Definitely, you will want to have completed your tapping by mid-February.

Necessary Equipment

Maple syrup can be produced with a minimum of equipment, but a few standard items increase the efficiency of sap collection and the quality of the syrup:

* a drill with a 7/16 or 1/2 inch bit,

* a metal sprout or spile for each taphole,

* a container (bucket or plastic bag) or tubing line to collect the sap from each taphole,

* metal trash cans with plastic liners to store sap,

* a large pan for boiling down the sap,

* a large-scale thermometer calibrated at least 15 degrees above the boiling point of water,

* wool, Orlon, or similar type filters for straining hot, finished syrup,

* containers for storing the finished product,

* storage facility.

Tapping the Tree

Trees that are 10 inches in diameter (31 inches in circumference) are big enough to tap. Smaller trees should not be tapped. For best sap production, a tree should have a short trunk with a full-spreading crown. Good sugar bush management of involves cutting practices which favor the development and retention of such trees.

Tapholes are drilled into the trunk at a height of 2 to 4 feet above ground. Here is a good rule for determining the number of tapholes that can be safely made in a single tree:

Tree diameter (inches)	Circumference (inches)	# Tapholes (per tree)
Less than 10	<31	0
10-14	31-45	1
15-19	46-61	2
20-24	62-76	3
25 or more	77+	4

Trees may be marked with a painted numeral, a series of paint dots, or different colors to indicate the number of taps per tree so subsequent measuring is eliminated each season. Making fewer taps than is permissible reduces the potential sap harvest without any benefit to the tree. Over-tapping may result in damage to the tree.

Drill a 7/16 or 1/2 inch hole approximately three inches deep into sound wood slanting it slightly upward to facilitate the downward flow of sap. Remove any loose wood shavings from the taphole. You may want to use one sanitizing pellet in each taphole. These pellets inhibit the growth of bacteria which could plug the taphole and cause a premature end to the sap flow. The pellet should be inserted into the taphole prior to tapping the spile in place. It should be pointed out that research has shown that use of sterilizing pellets may encourage decay of the wood around the hole.

Lightly tap a spile (Figure 3) into the hole with a hammer until it is held firmly in place by the wood (not the bark). If a bucket or plastic bag is used to collect the sap, the spile must be able to support considerable weight. Be careful not to drive the spile in too far. Forcing a spile could crack the wood and leave channels where sap could escape. Take care to avoid driving the spile to the rear end of the taphole. Attach a bucket, plastic bag, or tubing line to the spile. If you are using open buckets to collect sap, make sure to cover them so rainwater and debris does not fall in. Commercial sources for buckets, covers, plastic bags, tubing, spiles, and sanitizing pellets are listed at the end of this article.

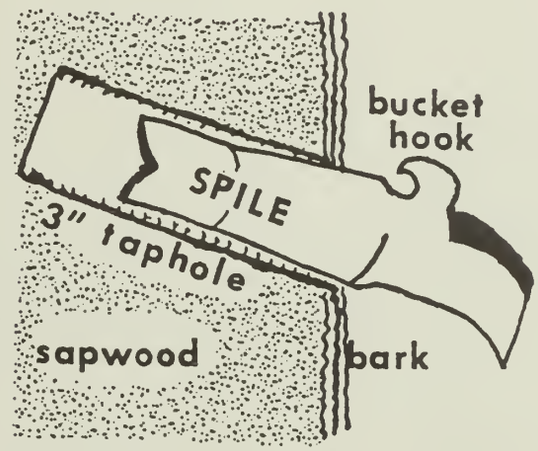

Figure 3. Spile placement

If you're placing several taps in a tree, distribute them evenly around the circumference of the trunk in an upward, spiral pattern. If the tree has been tapped previously, new tapholes should be at least six inches away from the old holes. If new bark and wood has grown over old tapholes (this takes 2-3 years), the old holes may not be noticeable. You must avoid the wood around the old tapholes because it will not yield any sap. This wood will be darkly stained, and so by paying close attention to the color of the wood shavings at each taphole, you can be certain you are only tapping fresh, light-colored sapwood.

Sap Collecting Equipment

The different types of containers used to collect sap at the taphole are metal or plastic buckets, plastic bags, and plastic tubing.

Galvanized metal buckets of 15-quart capacity are the oldest and probably still the most common containers. Buckets made of lead-coated metal, lead-soldered buckets, or buckets painted with lead paint should not be used because the lead may

dissolve in the sap. The syrup would contain toxic lead residues.

Many syrup producers prefer plastic sap bags because they require minimum storage space and are easily transported in the woods. Moreover, the plastic is transparent to the ultraviolet rays in sunlight which are lethal to micro-organisms and tend to keep the sap sterile. The plastic bags are also disposable which reduces the task of cleaning collection equipment.

Plastic tubing provides an economical, labor-saving method of sap collection. Because it is a closed system, tubing minimizes microbial infections, eliminates the need for sterilizing taphole pellets, and keeps the sap clean and free of foreign matter. The development of plastic tubing for sap collection has probably done more than any other factor to revolutionize the maple syrup industry. Tubing has many advantages:

1. lowers labor costs and spreads them more uniformly over the period,

2. minimizes access and terrain problems,

3. produces greater sap yields than buckets and bags,

4. reduces initial costs per taphole,

5. improves sap quality,

6. allows the use of artificial vacuum to produce greater sap yields per taphole.

A source of information on collecting sap with plastic tubing is listed at the end of this article.

Collecting the Sap

Normally, a single taphole produces from a quart to a gallon of sap per flow-period (a few hours to a day or more). The seasonal accumulation is usually between 10 and 12 gallons.

Check the sap buckets daily, and empty and clean them. Sap should be emptied into a clean collecting bucket and later into a clean storage container. If you have more than a dozen tapholes, you might want to store the sap in a new plastic storage bin kept outdoors. Make sure the bin is clean and has a tight cover. Smaller runs could be collected in clean, covered pots kept in the refrigerator. Wash the storage containers between batches. The key words of successful sap collection are "clean and cool". Sap is a perfect food for bacteria and molds and these microbes will ruin your syrup unless you discourage their growth. Sap should be stored for as short a period of time as possible, certainly not more than three days. Ideally it should go directly from the tree to the boiling pan, but often with small operations, you will not have enough sap from one run to warrant boiling down a batch.

Boiling the Sap

It takes roughly 35 gallons of sap to make one gallon of syrup. The exact equivalence depends on the percent sugar content of the sap (degrees Brix). This is greatly influenced by the weather and when the sap was collected. The process of making maple syrup is essentially one of concentrating the sap to a predetermined level by boiling it. The heat applied in the process develops the syrup's characteristic color and flavor.

With your syrup needs in mind, you can plan the number of trees to tap and approximate volume of sap you will have to boil. If this quantity is large, you'll want to construct a large outdoor wood-burning furnace that will hold a large-bottomed pan. For smaller quantities, you may be able to use a kitchen range and pans. If you boil the syrup indoors, you must vent the boiling area to the outdoors. Thirty-four gallons of water will be released into the air for each gallon of syrup. This could cause paint to crack, wallpaper to peel, and cool surfaces to sweat with condensation.

You should boil the sap (syrup) as quickly as possible without scorching or burning it. To maintain rapid boiling, you should have only a couple inches of sap in the boiling pan; thus, to make large quantities of syrup you need large-bottomed pans and a large cooking surface. When the syrup is concentrated, it will splatter. Boiling pans should be at least eight inches deep and hold at least three times the volume of syrup you will be making per batch. Filter the sap through cheesecloth as you pour it into the boiling pan. This will remove any large particles of dirt or debris. Cover the bottom of the pan with 2 inches of sap and turn the heat to high.

Finished syrup boils at seven degrees above the boiling point of water. The boiling point of water changes slightly depending on the barometric

pressure and location, so you'll need to determine the boiling point of water with your thermometer on the day you make syrup. Right this temperature down.

As the sap begins to boil the level in the pan will lower due to evaporation. Add more sap and take care not to burn or scorch it. Stir occasionally and skim the surface of the boiling liquid to remove any surface foam. Continue adding sap and boiling until your pan is approximately one-third full of the highly-concentrated sap. Carefully note the liquid's rise in temperature above the boiling point of water. When the syrup reaches 7 degrees above the boiling point of water, it's done. Remove it immediately from the heat source and transfer it to clean containers.

The hot syrup will have small suspended particles called "sugar sand" in it, so it needs to be filtered before it goes into the storage containers. A "two-stage" filter should be used. The first filter consists of several layers of cheesecloth. The second filter should be a layer of wool, Orlon, or felt. The temperature of the syrup should be maintained above 180 degrees F as it is poured into the storage container so the heat sterilizes it. Place filled and capped containers on their sides so that the hot syrup sterilizes the cap. Store the containers in a cool, dry place. Opened containers should be kept in the refrigerator. If opened syrup containers show signs of mold, skim off the mold, heat the syrup to boiling, and pour it into a clean jar.

Season's End

When the tapping season is over, be sure to remove all spiles from the trees. Wash all your sap and syrup equipment thoroughly. Just prior to re-using the sap collecting equipment, you should sterilize it with a dilute Chlorox solution (1 part Chlorox in 10 parts water).

You may be wondering whether tapping trees is harmful to them. The answer is it does not appear to be. Individual trees have been tapped annually for over a hundred years with no evident damage. Careful tapping draws less than one-tenth of the tree's reserve of sugar. Wood and bark will grow over the tapholes in a couple years. If the tree is later harvested for lumber, boards cut from the log a short distance above the taphole region will be free of stain defect. This is one reason why it is desirable to keep tapholes as low on the trunk as is conveniently possible.

SOURCES: Hooper, Celia 1983. **Making Maple Syrup.** Forestry Leaflet No. 18, Illinois Cooperative Extension Service, Urbana.

Vogt, Carl E. 1983. "Let's Try Maple Syrup." **Proceedings of the Ninth Forest Owners and Users Conference.** Illinois Cooperative Extension Service, Urbana.

EDITOR'S NOTE: For more information on maple syrup production try these publications:

Coons, C.F., 1987. **Sugar Bush Management for Maple Syrup Producers.** Ontario Ministry of Natural Resources, Canada. Single copies available at no charge. Mail orders: MGS Publications Services Section, 5th Floor, 880 Bay St., Toronto, Ontario M7A 1N8. Toll free phone orders: 1-800-268-7540.

Houston, David R., Douglas C. Allen, and Denis Lachance, 1990. **Sugarbush Management: A Guide to Maintaining Tree Health.** USDA-Forest Service, Northeastern Forest Experiment Station General Technical Report NE-129. Available from: Northeastern Forest Experiment Station, 100 Matsonford Rd., Radnor, PA 19087 (inquire regarding cost).

Lancaster, K.F., R.S. Walters, and A.H. Rye, 1982. **Collecting Maple Sap with Plastic Tubing.** USDA-Forest Service Publication No. NA-FR-23. Available from: Sugar Maple Laboratory, Northeastern Forest Experiment Station, USDA Forest Service, Burlington, VT 05401.

Nearing, H. and S. Nearing, 1950. **The Maple Sugar Book.** New York: The John Day Company, 271 pp.

Willits, C.O. and Claude H. Hills, 1976. **Maple Syrup Producers Manual.** Agricultural Research Service-USDA Agriculture Handbook 134. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock # 001-000-03504-5. Phone orders accepted (202) 783-3238 with MasterCard or Visa.

Sources of Maple Syrup Supplies:

Coombs Maple Products, Inc., Jacksonville, VT 05342 (802) 368-2345

Reynolds Sugar Bush, Inc., Route 1, Aniwa, WI 54408 (715) 449-2536

Smada Farms, Inc., Star Route, Rt. 41N, Greene, NY 13778 (607) 656-4058

Sugar Bush Supplies Co., 2611 Okemos Rd., Mason, MI 48854 (517) 349-5185

TRACKS features articles on small game and non-game management for woodland owners. If you have a particular question you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

The following article is reprinted with permission from **Guidelines for Increasing Wildlife on Farms and Ranches**, a publication produced by the Great Plains Agricultural Council Wildlife Resources Committee and the Kansas State University Cooperative Extension Service.

BRUSH PILES IMPROVE HABITAT

by Gerald F. Bratton, Area Extension Forester, Kansas State and Extension Forestry

Brush piles serve as high quality shelter and cover for many wildlife species. Primarily small mammals use this type of cover when available, but brush piles are especially important to the cottontail rabbit. When constructed and located properly, brush piles are heavily used as resting and escape cover.

Brush piles should be constructed in edges of other cover types such as brush or woodland. It is helpful if they are located near cultivated land or grassland since wildlife will need food and nesting cover close. Spacing the brush piles at intervals of 100 to 200 feet will provide adequate cover as well as travel lanes.

Construction

Properly constructed brush piles are more than just an armful of limbs in a pile. They will serve more wildlife for a longer period of time if they are carefully planned and constructed. The pile must be dense enough to constrain predators and provide shelter during bad weather and be loose enough around the edges to provide easy access.

The first step in brush pile construction is to build a base. Start with logs (poles) that are six to ten inches in diameter and six to eight feet long. Place four of these poles on the ground parallel to each other, eight to twelve inches apart. Place four more poles of the same size across the top perpendicular to the first four poles. Other materials can be used for the base such as large rocks or stumps. The large materials will serve to keep "tunnels" open under the pile after the brush is stacked on top. The addition of one or more six to eight inch sewer tiles buried on one end creates durable, ready-made burrows.

After the base is constructed, pile limbs and brush on top until the brush pile is four to six feet high. Start with larger limbs first and gradually add smaller-sized ones. Make the pile dense in the middle and loosen it up near the edges. It may be necessary to add more limbs as the pile settles and decomposes. Planting vines and shrubs near the edge will add years to the life of the brush pile.

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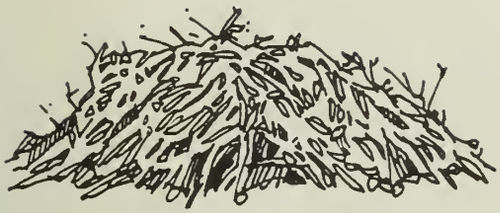
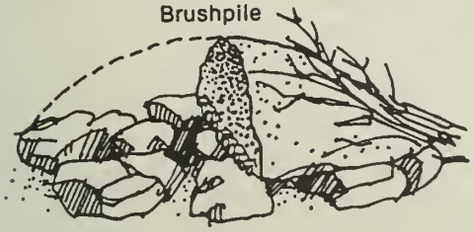
Cover for Wildlife



Brushpile



Earth and Stone Retreat

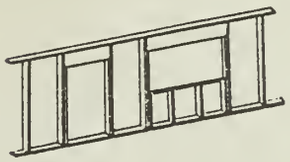
Logs and Stones

ANIMAL DAMAGE CONTROL INFORMATION AVAILABLE TO PRIVATE LANDOWNERS

Landowners who are experiencing a problem with wildlife damage can receive assistance in dealing with the problem by contacting Animal Damage Control (ADC), an agency within the USDA Animal and Plant Health Inspection Service. This agency's role is to resolve human/wildlife conflicts that occur to agriculture and natural resources. Their goal is to efficiently and economically solve these conflicts without adversely affecting the wildlife resource. ADC does not initiate any control activity or provide technical assistance until requested by the individual experiencing wildlife damage. If you are experiencing a wildlife-related problem, ADC encourages you to contact them at the following offices:

Animal Damage Control, USDA, APHIS
Federal Building, Room 105
600 East Monroe St.
Springfield, IL 62701
217/492-4308

Animal Damage Control, USDA, APHIS
Dixon Springs Agricultural Center
University of Illinois
Simpson, IL 62985
618/695-3553



CUTTING UP

WOODEN FENCE POST and OUTDOOR WOOD

Wood is one of nature's most valuable and versatile gifts to mankind. It has served us well for centuries and, because it is renewable, it will continue to do so. Energy-intensive, nonrenewable substitutes have often imitated but never duplicated it. It remains a preferred raw material for a myriad of uses. In addition to its excellent technical properties, wood has a warm, natural beauty enhanced by its unique variability in color and grain.

But wood users and consumers need to understand the inherent variability and technical limitations of wood to use it properly and wisely for particular purposes. This article will discuss the specific considerations involved in using wood in outdoor settings.

Wood Structure

The cross section of a tree stem often reveals zones of different colored wood inside the bark (Figure 1). An outer zone of lighter-colored sapwood can be distinguished from the inner zone of darker-colored heartwood. In some species these zones are not distinct in color, but they are present nonetheless.

Other features of the wood structure can also be seen, such as annual growth rings, rays, and even wood cells in the earlywood and latewood portions of the annual rings.

Wood is known as an anisotropic material, which simply means that its properties have different values when measured along different directions. This occurs because wood's structure is inherently variable. Most wood cells are oriented in the longitudinal direction of the tree stem, whereas some

specialized cells, such as wood rays, have a horizontal orientation. A mixture of different types of cells serving different physiological functions such as storage, transport, and strength, make up the wood cross section. The same type of cell varies in size and shape from earlywood to latewood in an annual growth ring or from sapwood to heartwood.

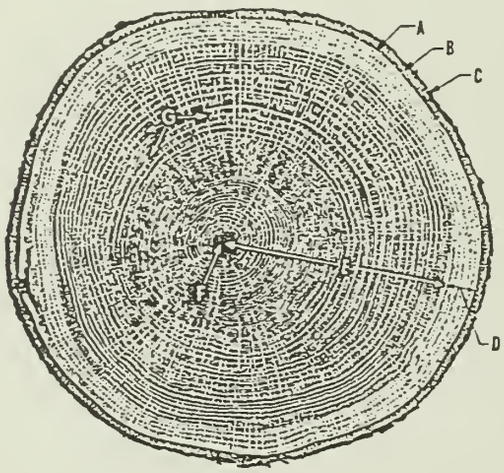


Figure 1. Cross section of a white oak tree trunk: **A,** Cambium layer (microscopic) is inside the inner bark and forms wood and bark cells. **B,** Inner bark is moist, soft, and contains living tissue. It carries prepared food from leaves to all growing parts of tree. **C,** Outer bark containing corky layers is composed of dry, dead tissue. It gives general protection against external injuries. Inner and outer bark are separated by a bark cambium. **D,** Sapwood, which contains both living and dead tissues, is the light-colored wood beneath the bark. It carries sap from roots to leaves. **E,** Heartwood (inactive) is formed by a gradual change in the sapwood. **F,** Pith is the soft tissue about which the first wood growth takes place in the newly formed twigs. **G,** Wood rays connect the various layers from pith to bark for storage and transfer of food.

The moisture content of trees may vary from as little as 30 percent to more than 200 percent of the wood's weight. In most species, moisture content in sapwood is normally higher than that of the heartwood. It is important to know something about the moisture content of wood when considering how it will be used. Wood is hygroscopic, which means that its moisture will be continually gained or lost depending on air temperature and humidity.

Wood structure and wood properties can vary widely among the many available species of wood. Thus, we always need to compare the characteristics of certain species to the technical properties need for specific purposes. When necessary, we can modify our designs or the wood itself to allow for the satisfactory use of a particular species.

Natural Enemies of Wood

Under proper conditions, wood can last for centuries when it is protected from its natural enemies. Chief among these are wood-inhabiting fungi and insects. Under certain rare conditions, these agents can completely destroy wood in less than a year.

Some fungi, including molds and sap stain, damage little more than the appearance of wood. Wood-decay fungi, however, attack the structural tissues of wood, causing it to crack, shrink, crumble, and dissolve.

Subterranean termites are by far the most destructive wood-inhabiting insects. They attack and weaken wood by literally eating the entire wood substance.

Like other living organisms, wood-decay fungi and insects have basic biological needs. They must have oxygen, the proper temperature, moisture, and food. Eliminate any one of these items, and the organisms cannot live. Because decay fungi and insects have the same temperature and oxygen requirements that humans have, it is almost impossible to kill them by controlling these aspects of the environment. Thus, the most effective ways to control decay are to eliminate wood moisture or food supply.

Much of the wood used in homes and other structures is protected from decay because it remains dry (less than 20 percent moisture content) and will not support decay fungi. For many outdoor uses, however, wood moisture content cannot be controlled. In addition, even dry wood will not necessarily provide protection against subterranean termite attack. These insects live in the soil and bring their moist environment to the dry wood via earthen tube tunnels.

The last alternative for the control of damage is to eliminate or poison the food source. Wood can be made toxic to decay fungi and insects through preservative treatment. Good preservative treatment can extend the life of wood to 30 or more years even when the wood is used under the most hazardous conditions.

Comparative Decay Resistance of Native Species

Regardless of the species, the sapwood zone has a very low resistance to decay and will have a short service life (often less than 1 year) under hazardous conditions. As shown in Table 1, the heartwood of native species have varying degrees of decay resistance.

Table 1. Comparative decay resistance of the heartwood of common native species

Resistant or very resistant	Moderately resistant	Slight or no resistance
Catalpa	Bald cypress [a]	Alder
Cedars	Douglas-fir	Ashes
Cherry, Black	Honeylocust [b]	Aspens
Chestnut	Larch, western	Basswood
Cypress, Arizona	Oak, swamp chestnut	Beech
Junipers	Pine, eastern white [a]	Birches
Locust, black [c]	Pine, longleaf [a]	Buckeye [b]
Mulberry, red [c]	Pine, slash	Butternut
Oak, bur	Tamarack	Cottonwood
Oak, chestnut		Elms
Oak, Gambel		Hackberry
Oak, Oregon white		Hemlocks
Oak, post		Hickories
Oak, white		Magnolia
Osage orange [c]		Maples
Redwood		Oak (red & black species)[b]
Sassafras		Pines (most other species) [b]
Walnut, black		Poplar
Yew, Pacific [c]		Spruces
		Sweetgum [b]
		Sycamore
		Willows
		Yellow-poplar

[a] The southern and eastern pines and baldcypress are now largely second growth with a large proportion of sapwood. Consequently, substantial quantities of heartwood lumber of these species are not available.
[b] These species have higher decay resistance than most of the other woods in their categories.
[c] These woods have exceptionally high decay resistance.

Protecting Wood in Outdoor Uses

The most hazardous outdoor locations for wood use are:

1. above-ground locations frequently wetted,

2. locations in contact with the ground, and

3. foundations.

Treated wood should be used whenever wood is in contact with the soil, a concrete slab, or when it is in a location that frequently gets wet. Wood at the ground-line or just below the soil surface is in the greatest danger of decay because it remains at optimum moisture level for attack by fungi or termites.

Pressure-treated posts and lumber are strongly recommended for all high-hazard locations. Commercial wood treated with waterborne preservatives such as CCA (chromated copper

arsenate) is readily available and provides distinct advantages for situations in which wood is used near humans, food, and plants. Such wood is toxic to wood-destroying organisms, paintable, clean, and odorless. In addition, the preservative will not leach in the presence of water. However, such wood must be redried after treatment or the wet wood may warp and twist. Also, preservative-treated wood will still show effects of weathering, e.g., surface checks and cracks.

Pressure Treatment Certification

There are several levels of commercial treatments available, each applicable for a different use. Wood-treating standards for each use are specified by the American Wood Preservers' Bureau so the consumer is assured of adequate protection. Quality marks are stamped on treated wood products for Above Ground, Ground Contact, and Foundation uses (Figure 2). These treated materials are then inspected to insure that they meet the required chemical retention and penetration standards.

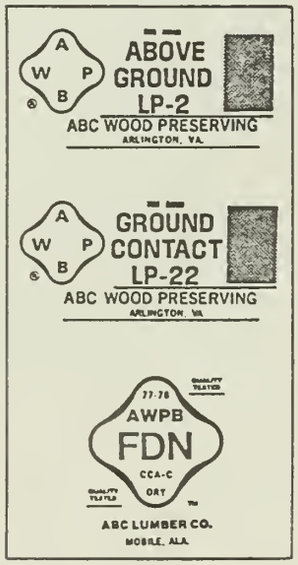


Figure 2. Wood preservation quality marks of the American Wood Preservers' Bureau.

Cost and Durability

Treated wood generally costs 1 1/2 to 2 times more than untreated wood, depending upon the treatment and preservative used. This higher initial cost should be weighed against the potential replacement costs of untreated posts and wood structures that become unserviceable.

The cost of the replaced wood part may be small when compared to the labor costs required for installation. Parts which are not readily accessible for inspection and replacement require a long service life. Selecting the proper species for specific uses and using preservative-treated wood when required are truly cost-effective. Wood's amazing versatility and integrity are maintained by using it properly.

SOURCE: Peterson, Theodore A., 1983. Wooden Fence Post and Outdoor Wood. **Proceedings of the Ninth Forest Owners and Users Conference**; Illinois Cooperative Extension Service, Urbana.

FOREST TREE NURSERY DIRECTORY AVAILABLE

Interest in tree planting has exploded and has left many landowners looking for a ready source of tree seedlings for their planting projects. The Directory of Forest Tree Nurseries in the United States has been produced by the American Association of Nurseryman in Cooperation with the USDA-Forest Service. Single copies can be purchased for $20.00 from:

Publication Sales Coordinator
American Association of Nurseryman
1250 Eye St., NW, Suite 500
Washington, D.C. 20005

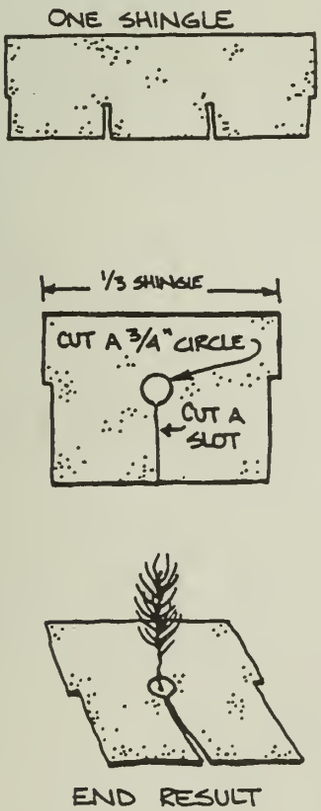
RECYCLED SHINGLES CAN HELP SURVIVAL OF TREE SEEDLINGS

Too much material is published on how to plant a tree and not enough on how to help it survive the first couple of years.

Here's a unique way to protect new tree seedlings from weed competition, and at the same time, recycle old roof shingles.

Cut a shingle into thirds along the grooves. Cut a hole and a slot in the middle of each piece of shingle. Plant the tree and slip the shingle around the base of the seedling.

The shingle will give you a one-square foot weed-free area that will keep the moisture in and will last for years.



SOURCE: **Friends of the Forest Newsletter**; April, 1990.

SilvaScene

PRINCIPLES OF MANAGING STANDS

Forest stands are managed to achieve some combination of desired products or values. These products or values may include income and tangible benefits from timber production or fees for hunting rights and other recreational activities. The values may be intangible, such as the enjoyment of seeing wildlife or flowering plants, or the simple satisfaction of knowing that there is an area undisturbed by human activities.

Defining Your Objectives

With such a diversity of benefits possible, it is extremely important that you as a forest landowner or manager clearly define your objectives before you make any decisions on how to manage the land. For some objectives, management may be very intensive, with frequent cuttings and other procedures that substantially affect the forest character. For other objectives, proper management may involve doing nothing more than providing minimum protection against fire, insects, and diseases.

Once you define your objectives, an overall silvicultural (management) system can be selected. This system defines the combination of cutting methods and cultural practices to be used. It determines the amount of area regenerated each year and the size of the regeneration openings, which in turn establishes the distribution of tree sizes, ages and species over the area. This manipulation of the vegetative cover is the primary tool of the forester; it affects esthetics, visual and biological diversity, wildlife habitat, water yields, plant and animal species composition, tree growth, economic returns, and many other forest attributes. Associated cultural practices, such as the use of herbicides, fertilization, and site preparation, are tools that increase the effectiveness of cutting practices to obtain the desired vegetation.

The basic unit of management for regulating the forest vegetation is the stand. Stands are areas of relatively uniform site and forest conditions. They vary in size according to: management goals, the size of the overall forest, and the practical considerations of harvesting and applying silvicultural practices. Stand size usually ranges from 5 to 100 acres, but smaller and larger areas are sometimes used. The overall management plan is implemented by applying silvicultural practices in an ordered sequence to individual stands.

Developing Stand Prescriptions

The extreme variation found within the central hardwood forests calls for a systematic process to develop stand prescriptions. Your first step is to inventory site and vegetation. Then you should analyze these data to evaluate the stand's stage of maturity, potential for future growth, ability to regenerate, condition of wildlife habitat, and similar factors. After you consider alternatives for the particular site and stand, you should develop a prescription to move this stand toward the overall goals for the property, taking into account the resources available to implement chosen actions.

Stand Management Goals

Some of the more important stand management goals are:

1. Establish regeneration. For long-term forest development, establishing desirable regeneration is one of the most critical management tasks. Harvested trees and trees with low potential value should be replaced with desirable species suited to the site and goals of the landowner.

2. Control species. Species composition determines the value produced, in terms of timber value, food and habitat value for wildlife, and scenic value. Species composition also determines growth potential since certain species grow faster than others.

3. Control density. Stand growth and yield and timing of yield are determined in large measure by stand density. In dense stands, individual trees grow slowly, harvests are delayed, economic returns are reduced, and trees with poor vigor are more susceptible to insect and disease damage. Such stands offer little vegetative cover or food for ground nesting birds or browsing animals. In stands that are too open, total yields may be reduced and individual tree quality is often poor because of bole branches and other defects. Mast and fruit production for wildlife may be very low in open stands.

4. Reduce losses to insects, diseases, and fire. The best way to reduce insect and disease losses is through timely application of silvicultural treatments. Providing adequate growing space, maintaining desirable species mixtures, and creating fire lanes are examples of management actions you can take to reduce losses.

5. Enhance nontimber value. The quality and quantity of nontimber benefits can be positively affected by stand management practices. Dead snags and den trees can be protected to increase the number of cavity-nesting birds and animals, minimum disturbance zones can be identified, and harvest cuts can be distributed in time and space to assure consistent wildlife habitat. Nontimber values can often be enhanced with little or no loss of timber production.

Achieving Stand Management Goals

You achieve goals through regeneration cuttings and intermediate stand management practices. The regeneration cuttings determine the potential stand productions as well as the organization of the vegetative cover over the whole forest. Through the regeneration practices you establish the potential for the property to provide the long-term goals of the owner/manager.

Intermediate management practices (sometimes called forest improvement practices), are applied to ensure the survival and increase the growth of desired species, to reduce the time to harvest, to improve the quality of future harvests, to improve tree vigor, to enhance wildlife food or cover, etc. In the managed forest, the extent of these practices determines how much of the potential established by regeneration practices will be realized. Previously mismanaged forests can be made more productive through timely application of intermediate management practices.

Regeneration Considerations

It is usually not difficult to obtain natural regeneration in central hardwood forests. New tree seedlings will usually become established after any type of harvesting or natural stand disturbance, except where dense understories of undesirable trees, shrubs, and herbaceous species are present. On the other hand, establishing a particular species can be difficult.

Dense understories of undesirable vegetation will prevent establishment of desirable tree species. Newly germinated tree seedlings cannot compete with established vegetation for light, soil moisture, and nutrients. If undesirable understory vegetation is too dense, control measures may be needed. Herbicides provide the most efficient and effective means of control, but uprooting of woody vegetation with the

blade of a tractor of during logging may also be effective.

The cutting method selected for regeneration has a major impact on the species regenerated. A key silvical characteristic is shade tolerance, the capacity of a species to survive and grow in shade. Very tolerant species require full sunlight. There are many species with intermediate shade tolerance. Generally, the more shade-tolerant species can become established beneath the canopies of the intolerant species and will replace them in undisturbed stands. But the most intolerant species will not develop in the shade of other trees.

There are five commonly-used regeneration cutting methods: individual tree selection, group selection, shelterwood, seed-tree, and clearcut. Each is an orderly procedure to harvest mature stands and to create microclimates favorable to the desired species or, conversely, unfavorable to unwanted species. The methods differ in the amount of canopy removed and the resulting degree of exposure of the forest floor to sunlight. Essentially, each method simulates various kinds of natural disturbances. All regeneration methods can be used in central hardwood forests.

With the individual tree selection method, relatively few trees are harvested at one time, resulting in continuous shad on the forest floor. So it is useful only for tolerant and very tolerant tree species such as sugar maple and beech. Since very valuable, less tolerant species such as red and white oak, black walnut, black cherry, and others cannot be regenerated by this method, it is seldom recommended for timber production. However, selection forests appear natural and relatively undisturbed and often are preferred where esthetic and recreation values are highest. Their interspersed crown levels also provide excellent habitat for nongame birds. On the other hand, they generally provide poor habitat for ground dwelling birds and animals because plants in this stratum are not very diverse.

Methods other than single-tree selection are necessary to regenerate less tolerant species. Group selection cutting, with openings ranging from 1/3 to 2 acres in size, can be used to secure reproduction of desired, less tolerant species such as red oaks, white ash, green ash, black cherry, cucumbertree, red maple, and-to some extent-yellow-poplar. The proportions of valuable species may be less with group selection than obtained with shelterwood and clearcutting, but they are substantially higher than with single-tree selection. The mosaics of various size trees and variety of shrub and herbaceous species also provide excellent habitat for a wide variety of wildlife.

Epicormic branching on border trees with poor crowns may cause quality defects in group selection forests. Group and patch selection are seldom used for managing large properties because yield regulation and cultural practice applications are inefficient compared to other methods. However, group selection provides a useful compromise for landowners who want vegetative and wildlife diversity, but object to larger cuttings.

Shelterwood and clearcutting methods are well suited to central hardwood forest types, where the most valuable species tend to be shade intolerant. The choice between the two cutting methods is based primarily on presence of advanced regeneration of appropriate size, and wildlife, water, and esthetic objectives for each particular tract. Shelterwood cutting is useful in the oak-hickory type when oak advance regeneration is not adequate is size or numbers. Clearcutting requires fewer returns to the stand for cutting ("entries") and is less costly to administer than the shelterwood cuttings, so it is the preferred method when advance seedling regeneration is adequate. When shelterwood cutting is used, the number, intensity and sequence of cuts, intervals between cuts, and supplementary treatments applied must be carefully tailored to stand conditions and species present.

Clearcutting also produces more browse and forage for wildlife species such as deer than shelterwood cutting. However, browse is available over a longer period of time under a shelterwood. Clearcutting is the only cutting method that will produce water increase large enough to justify cutting for this purpose. This is likely to be a serious consideration only on municipal watersheds.

Many forest users object to clearcuts and shelterwoods because of their appearance during the years immediately after cutting. Attempts to minimize slash and soil disturbance and limits on size of openings and their proximity to older ones help reduce visual impacts; even so, these cuts remain unsightly to many people. As a consequence, clearcutting and shelterwood cutting are the least

suitable in areas where recreation or visual goals are primary.

There is no universal "best" regeneration method. Each method meets specific requirements and owners will have different objectives and different levels of resources available to meet those objectives. Since most landowners have varying objectives, several or all methods are often appropriate for the same property.

Intermediate Stand Management

Intermediate cuttings may be necessary to enhance the development of existing stands to meet the overall goals for the property. Some trees are cut or killed to ensure survival and growth of more desirable trees. Intermediate harvests may be commercial but often an investment is required because of tree size or value, or local market constraints.

In central hardwood forests, stands are often harvested through some form of "high grading" or cutting only the most valuable trees. When timber production is a management goal, intermediate cuttings must be considered for high graded stands. In these stands high value species and large diameter trees have been cut, leaving low value species and poor quality trees to occupy growing space, and to regenerate the next stand. This is still the most prevalent harvesting method on nonindustrial private forest lands.

Abundant reproduction usually develops beneath relatively open canopies of high graded stands, followed by suppression of the reproduction as the overstory expands. As a result of the suppression, the reproduction slows in growth and begins dying. The less tolerant species die first and many remaining stems develop poor form from bending toward crown openings. Ideally, the undesirable overstory should be cut or killed before it begins to suppress the desirable reproduction. Such release cuttings are effective if applied within 5 to 15 years, depending on overstory density. Usually all overstory trees should be cut or killed in one operation, but some trees might be left for longer periods. For example, trees that are undesirable for timber production may be highly desirable for wildlife habitat if they contain nesting cavities, perch sites, and produce mast or fruit.

There are millions of acres of older high graded stands in the eastern United States that have not had release cuttings. Invariably, undesirable growing stock greatly outnumbers desirable growing stock. But there are sufficient good growing stock trees in most of these stands to provide the base for a productive future harvest. You can start rehabilitation of such stands by an improvement cut. Cut of kill undesirable trees to favor better ones. Always encourage the development of the best trees. You want to accelerate the growth of the best trees, not merely harvest or kill the poor ones.

There is considerable confusion outside of the forestry profession about selection silviculture. To many, the removal of scattered large diameter trees is an effective application of the selection method. However, without improvement cuttings throughout all diameter classes to regulate diameter distribution and release good growing stock, such cuttings are high grade harvests which lead to quality and value decline.

Intermediate cuttings can have both adverse and beneficial effects on nontimber values, so take care to enhance and protect all values. For example, you can improve scenic values by releasing understory flowering trees and shrubs. You can reduce safety hazards in recreation areas by felling live and dead trees, pruning branches, and thinning to maintain vigorous, healthy trees. Thinning and improvement cuts in young even-aged stands can be used to improve vertical diversity and ground vegetation for many animal and bird species.

Summary

Forests should be managed to meet specific landowner goals-usually a combination of goals. The goals are reached by applying silvicultural practices in an ordered sequence to individual stands. Prescriptions are developed to move each particular stand toward the overall goal for the property. Stand management practices are aimed at establishing regeneration; controlling species composition and density; reducing losses to insects, diseases, and fires; and enhancing nontimber values. These goals are achieved by applying regeneration and intermediate cutting methods.

SOURCE: Marquis, David A. and Rodney Jacobs, 1989. "Principles Of Managing Stands"; **Central Hardwood Notes.** USDA - Forest Service, North Central Forest Experiment Station.

Timber Prices
November 1989-February 1990
May 25, 1990

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
NOVEMBER 1989 - FEBRUARY 1990

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
				Dollars			
1. Sawtimber							
Ash	M bd. ft.	50 - 250	125 - 380	80 - 250	120 - 500	60 - 200	150 - 500
Basswood	M bd. ft.	50 - 70	125 - 170	30 - 100	100 - 200	40 - 100	125 - 200
Beech	M bd. ft.	30 - 50	100 - 140	30	100 - 120	--	--
Cottonwood	M bd. ft.	25 - 50	90 - 140	20 - 60	90 - 140	20 - 50	110 - 150
Sweet Gum	M bd. ft.	30 - 60	100 - 140	20 - 55	110 - 140	--	--
Elm & Hackberry	M bd. ft.	30 - 80	100 - 140	20 - 60	100 - 150	20 - 100	110 - 150
Hickory	M bd. ft.	30 - 100	110 - 200	30 - 100	110 - 200	30 - 90	120 - 200
Soft Maple	M bd. ft.	40 - 100	100 - 160	30 - 100	110 - 200	30 - 100	110 - 200
Sugar Maple	M bd. ft.	40 - 100	120 - 250	30 - 100	114 - 200	50 - 100	150 - 250
Black Oak	M bd. ft.	50 - 200	125 - 300	50 - 200	110 - 300	40 - 150	100 - 300
Pin Oak	M bd. ft.	30 - 120	100 - 150	20 - 80	100 - 140	25 - 120	150
Red Oak	M bd. ft.	100 - 300	250 - 500	50 - 300	110 - 500	100 - 300	120 - 500
White Oak	M bd. ft.	50 - 250	240 - 400	50 - 300	110 - 600	100 - 300	120 - 450
Yellow Poplar	M bd. ft.	50 - 150	120 - 260	50 - 70	120 - 170	100	220
Sycamore	M bd. ft.	20 - 60	100 - 140	20 - 60	100 - 140	20 - 60	110 - 130
Black Walnut	M bd. ft.	150 - 500	350 - 700	100 - 600	300 - 900	250 - 600	400 - 800
Woods Run Bottomland	M bd. ft.	35 - 100	120 - 150	30 - 110	120 - 180	40 - 75	--
Woods Run Upland	M bd. ft.	40 - 225	120 - 200	40 - 150	120 - 220	50 - 200	--

		STATEWIDE	
		Stumpage	F.O.B.
2. Face Veneer			
Red Oak	M bd. ft.	200 - 1,000	450 - 1,250
White Oak	M bd. ft.	500 - 2,000	800 - 2,000
Walnut	M bd. ft.	400 - 4,000	900 - 3,500
3. Pulpwood			
Unpeeled	Ton	1.50 - 2.00	12.90 - 13.00
4. Cooperage			
White Oak	M bd. ft.	150 - 300	300 - 500

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	98
Scribner	2
International	-

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	33	100 - 200
Zone 2	33	80 - 200
Zone 3	33	100 - 250
ILLINOIS	33	80 - 250

VOLUME OF 1989 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	14	20	37	25
100 - 500	34	37	31	34
500 -1,000	14	13	6	11
1,000 -3,000	14	17	13	16
3,000 +	24	13	13	14

Cooperage is the manufacture of barrels. Face veneer: Logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers.

MARKED TIMBER SALES - NOVEMBER 1989 - FEBRUARY 1990

	STATEWIDE STUMPAGE*
Woods Run Upland	$108 - $217/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Fred S. Barrett
State Statistician

Dean Hasenmyer, Garry D. Kepley,
Agricultural Statisticians

"Printed by authority of the State of Illinois," 5/25/90, 1,800, 1499

ILLINOIS AGRICULTURAL STATISTICS SERVICE
P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4295
U.S. DEPARTMENT OF AGRICULTURE
ILLINOIS DEPARTMENT OF AGRICULTURE

ILLINOIS TIMBER PRICES

ILLINOIS DEPARTMENT OF CONSERVATION
life and land together

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361

May 25, 1990

PRICES PAID ILLINOIS TIMBER PRODUCERS NOVEMBER 1989 THROUGH FEBRUARY 1990

PRICE REPORTING ZONES

Winter sawtimber prices paid Illinois timber growers for stumpage and F.O.B. mill were mostly higher than a year earlier. Of the timber buyers reporting volume of their 1989 operations, 41% indicated their volume was 500 thousand board feet or more. This was up from 36% reported a year earlier on their 1988 operations.

This report is prepared by the Illinois Agricultural Statistics Service with the assistance of the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	November 1988-February 1989		May 1989-August 1989		November 1989-February 1990	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	118	271	136	268	138	298
Basswood	63	145	54	146	67	150
Beech	44	124	46	119	44	119
Cottonwood	41	118	41	118	37	119
Sweet Gum	47	125	42	122	44	122
Elm & Hackberry	47	127	45	122	48	124
Hickory	52	136	49	147	54	140
Soft Maple	54	135	53	146	55	142
Sugar Maple	58	150	64	142	66	170
Black Oak	101	159	96	176	106	192
Pin Oak	49	124	48	128	53	125
Red Oak	156	314	169	343	180	325
White Oak	137	289	164	335	173	284
Yellow Poplar	74	166	90	179	84	188
Sycamore	40	127	40	124	42	119
Black Walnut	326	512	288	515	322	542
Woods Run Bottomland	57	125	64	130	56	136
Woods Run Upland	99	140	109	163	106	157

FACE VENEER PRICES $ PER M BD. FT.

Red Oak	440	840	455	705	579	876
White Oak	851	1,525	819	1,321	977	1,350
Walnut	1,443	2,092	1,439	2,180	1,529	1,943

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	November 1988-February 1989		May 1989-August 1989		November 1989-February 1990	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	1.88	--	1.63	16.50	1.90	12.95

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	198	440	178	350	205	405

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 1, 1991 No. 20

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct you inquiries to **Editor, IFM Newsletter, 110 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.**

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WETLANDS - HOW THEY AFFECT LAND USE ON YOUR PROPERTY

President Bush has called for "no further loss of America's wetland resource" and this issue has become an important part of his "America The Beautiful" program. Adding teeth to this proclamation are The Swampbuster provisions of the 1985 and 1990 Farm Bills and Section 404 of the Clean Water Act.

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If you farm and participate in USDA Farm programs (ASCS benefits, any multi-peril crop insurance, FmHA loans), you should have received an aerial photo of your property which identifies different types of wetland areas, prior converted cropland, and nonwetland areas. How you've treated wetland areas on your property in the past

and your future plans for these areas are key to the compliance requirements for government programs and your eligibility for future programs. Most farmers participating in USDA programs are well aware of what they can and can't do with wetland areas on their property.

Of equal concern are those farmers who do not participate in government programs and landowners who may or may not live on the property and do not farm, but hold the property for some other use such as timber income, wildlife habitat, personal recreation, hunting, etc. **The wetlands regulations apply to YOU as well even though you do not participate in any government programs.** The wetland regulations may apply to you when you perform drainage work, construct levees, install culverts, fill wet areas, or carry out other construction-type activities such as building dams or other structures. Most of the activities you are likely to perform on your property that may impact wetland areas are covered under Section 404 of the Clean Water Act. Failure to obtain required permits from the US Army Corps of Engineers and/or the State of Illinois (IL EPA and the IL Division of Water Resources) can result in severe penalties. It is very important to know if you have wetlands on your property. These regulations apply to urban as well as rural properties.

What Is A Wetland?

The US Army Corps of Engineers and the US Environmental Protection Agency (EPA) jointly define wetlands as follows:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands are areas covered by water or that have waterlogged soils for long periods during the growing season. Plants growing in wetlands are capable of living in soils lacking oxygen for at least part of the growing season. Wetlands such as swamps and marshes are often obvious, but some wetlands are not easily recognized, often because they are dry during part of the year or *"they just don't look very wet"* from the roadside. Some of these wetland types include, but are not limited to, many bottomland forests, swamps, pocosins, pine savannahs, bogs, marshes, wet meadows, potholes, and wet tundra. The information presented here usually will enable you to determine whether you might have a wetland. If you intend to place dredge or fill material in a wetland or in an area that might be a wetland, contact the local Corps of Engineers District Office identified at the end of this article for assistance in determining if a permit is required.

Why All The Fuss?

Wetlands are a natural resource that have been particularly abused by the activities of people. Nearly 90 percent of Illinois's wetlands have been drained or filled. So, as wetlands become more rare, they become more valuable. Just as rich topsoil or favorable climate provides us with benefits, so do wetlands. Wetlands:

* help keep surface water and groundwater clean;
* store floodwater;
* trap sediment and attached nutrients;
* function as greenspace and recreation areas;
* contribute to groundwater recharge;
* provide habitat for fish and wildlife (including many endangered species);
* may be important to reduce global warming.

Not all wetlands do all things, nor do all wetlands benefit us to the same degree. A healthy environment, however, hinges on a landscape containing various kinds of wetlands functioning together efficiently.

Why Is It Necessary To Consider Whether An Area Is A Wetland?

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into "waters of the United States, including wetlands," must apply for and receive a permit for such activities. The Corps of Engineers has been assigned responsibility for administering the Section 404 permitting process. Activities in wetlands for which permits may be required include, but are not limited to:

* Placement of fill material;
* Ditching activities when the excavated material is side-cast;
* Levee and dike construction;
* Land clearing involving re-location of soil material;
* Land leveling;

* Most road construction;
* Dam construction.

The final determination of whether an area is a wetland and whether the activity requires a permit must be made by the appropriate Corps District Office.

How Can Wetlands Be Recognized?

The Corps of Engineers uses three characteristics of wetlands when making wetland determinations - vegetation, soil, and hydrology. Unless an area has been altered or is a very rare natural situation, wetland indicators of all three characteristics must be present for an area to be a wetland. Each characteristic is discussed below. However, there are some general situations in which an area has a strong probability of being a wetland. If any of the following situations occurs, you should ask the local Corps office to determine whether the area is a wetland:

* Area occurs in a floodplain or otherwise has low spots in which water stands at or above the soil surface for more than 7 consecutive days during the growing season. *Caution: Most wetlands lack both standing water and waterlogged soils during at least part of the growing season;*

* Area has plant communities that commonly occur in areas having standing water for part of the growing season (e.g., water tolerant trees, cordgrass marshes, cattail marshes, bulrush and tule marshes, and sphagnum bogs);

* Area has soils that are called peats or mucks. These are referred to as hydric soils. A list of the hydric soils of Illinois is available at your local Soil Conservation Service (SCS) office;

* Area is periodically flooded by tides, even if only by strong, wind-driven, or spring tides.

Many wetlands may be readily identified by the above general situations, but there are numerous wetlands in which it is unclear whether the above occur. In such cases, it is necessary to carefully examine the area for wetland indicators of the three major characteristics of wetlands - vegetation, soil, and hydrology. Although "typical" wetlands may suggest images of a cattail marsh or the shallow portions of lakes, the most common wetland types in Illinois are forested wetlands and small temporarily flooded wetlands in farmed fields. The following are wetland indicators of the above mentioned characteristics.

Vegetation Indicators

Nearly 5,000 plant types in the United States may occur in wetlands. A list of the types that occur in your area can be obtained from the local Soil Conservation Service office, the local Corps office, the US Army Engineer Waterways Experiment Station (WES), Attn: CEWES-EP-D, PO Box 631, Vicksburg, MS 39180-0631, or from the US Fish and Wildlife Service, National Wetlands Inventory, 9720 Executive Center Drive, Suite 101, Monroe Bldg., St. Petersburg, FL 33702. You can usually determine if wetland vegetation is present by knowing a relatively few plant types that commonly occur in your area. For example, cattails, bulrushes, cordgrass, sphagnum moss, baldcypress, willows, mangroves, sedges, rushes, arrowheads, and water plantains usually occur in wetlands. Other indicators of wetland plants can exist as trees having shallow root systems, swollen trunk butts (e.g., baldcypress, tupelo gum), or roots found growing from the plant stem or trunk above the soil surface. Several Corps offices have published pictorial guides of representative wetland plant types. If you cannot determine whether the plant types in your areas are those that commonly occur in wetlands, ask the local Corps of Engineers or Soil Conservation Service office, or a local botanist for assistance.

Soil Indicators

There are approximately 2,000 named soils in the United States that occur in wetlands. Such soils, called hydric soils, have characteristics that indicate they were developed in conditions where soil oxygen is limited by the presence of saturated soil for long periods of the growing season. The US Soil Conservation Service (SCS) has published a list of hydric soils. This list is available from the local SCS office, WES, or the local Corps office. If the soil in your areas is listed as hydric, the area might be a wetland.

If the name of the soil in your area is not known, there are several indicators of hydric soils that may be determined by examining the soil, including:

* Soil consists predominantly of decomposed plant material (peats or mucks)

* Soil has a thick layer (8 inches or more) of decomposing plant material on the surface;

* Soil has a bluish gray or gray color at 10 to 12 inches below the surface, or the major color of the soil at this depth is dark (brownish black or black) and dull;

* Soil has the odor of rotten eggs;

* Soil is sandy and has a layer of 3 inches or more of decomposing plant material at the soil surface;

* Soil is sandy and has dark stains or dark streaks of organic material in the upper layer 3 to 12 inches below the soil surface. These streaks are decomposed plant material attached to the soil particles. When soil from these streaks is rubbed between the fingers, a dark stain is left on the fingers.

Hydrology Indicators

Wetland hydrology refers to the presence of water either above the soil surface or within the soil for a sufficient period of the year to significantly influence the plant types and soils that occur in the area. The most reliable evidence of wetland hydrology is provided by gaging station or ground water well data. However, such information is limited for most areas and, when available, requires analysis by trained individuals. Thus most hydrologic indicators are those that can be observed during field inspection. Most do not reveal either the frequency, timing, or duration of flooding or the soil saturation. However, the following indicators provide evidence of the periodic presence of flooding or soil saturation:

* Standing or flowing water is observed on the area for 7 or more consecutive days during the growing season;

* Soil is water-logged. This can be determined by digging a hole to a depth of 12 inches and examining the soil. If water stands in the hole, if the soil glistens with water at any depth to 12 inches, or if water can be squeezed from the soil, the soil is waterlogged;

* Water marks are present on trees or other erect objects. Such marks indicate that water periodically covers the area to the depth shown on the objects;

* Drift lines, which are small piles of debris oriented in the directions of water movement through an area, are present. These often occur along contours and represent the approximate extent of flooding in an area;

* Debris is lodged in trees or piled against other objects by water;

* Thin layers of sediments are deposited on leaves or other objects. Sometimes, these become consolidated with small plant parts to form discernible crusts on the soil surface.

Wetland Determination

One or more indicators of wetland vegetation, hydric soil, and wetland hydrology must be present for an area to be a wetland. If you observe definite indicators of one or two, but not all three characteristics, you should seek assistance from either the local Corps District Office, your local SCS office, or someone who is an expert at making wetland determinations.

What To Do If Your Area Has Wetlands That You Propose To Fill

Contact the Corps District Office that has responsibility for the Section 404 permitting process in your area. The address and telephone number of this office are provided below. This office will accurately define the boundary of any wetlands on your property, and will provide instructions for applying for a dredge and fill permit, if necessary.

It is very important for you to know if you have wetlands on your property. Landowners face numerous regulations as they conduct their business in the 1990's. Although often frustrating, these rules reflect a growing concern for our environment in which wetlands play a crucial role. None of the regulations specifically prohibits work in wetlands. A wetland does not have to be "wasted space", but can become a valuable part of your property.

REPRINTED FROM: **Recognizing Wetlands.** US Army Corps of Engineers, October, 1987.

Miller, Brian W. and Forest Clark, **Wetlands, Regulations, and You**, Purdue University Cooperative Extension Service, 1991.

SELECTED ILLUSTRATIONS by Ned Smith; In: **Woodlands and Wildlife**, Hassinger, J., et al. The Pennsylvania State University, University Park, PA, 1979.

EDITOR'S NOTE: If you do not participate in USDA farm programs, you can receive a wetland determination for your property by completing a 1026 Form at your County Agricultural Stabilization & Conservation Service (ASCS) office. Look in the white pages of the phone book under United States Government, Agriculture Dept Of- for their office address.

If you would like to receive additional printed information on wetlands, the ***US EPA*** *has a toll fee number,* ***1-800-832-7828,*** *you can call. This wetlands information number serves as a*

clearinghouse for most printed wetlands information available to the public. If you have a specific publication in mind, they can refer you to the appropriate agency for information on its availability and distribution.

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LOGGER'S CHOICE ISN'T THE BEST ANSWER IN TIMBER SALES

by Bruce Bennett, State Staff Forester, Soil Conservation Service, Champaign, IL

A study conducted in Illinois by Dwight McCurdy and Carl Budelsky, professors of forestry at Southern Illinois University, produced some interesting conclusions. The study was conducted within the 11 southern-most counties of Illinois. This area is dominated by the Upland Central Hardwood Forest type consisting of oak and hickory species as the major overstory component.

For purposes of the study, a forester-assisted timber sale was defined as one in which trees were marked by an Illinois Division of Forest Resources District Forester. Sales marked by consulting foresters were not considered in this study. Non-assisted timber sales had no markings made by District Foresters or consulting foresters and were considered "logger's choice" sales. Twenty-acre sample areas were established within comparable assisted and non-assisted stands in terms of general location, aspect, slope position, soil series, estimated site index, date of sale, and minimum sale size.

The average acreage size of the sale was 50 percent larger for non-assisted versus assisted sales, yet the average assisted sale yielded an actual sale revenue per acre that was more than double that of the comparable non-assisted sale. This held true even though the non-assisted sales involved 20 percent more merchantable volume in board feet per acre (3,030 b.f.m. versus 2,540 b.f.m. respectively).

It also is interesting to note that 73 percent of the forester-assisted sales involved an up-front lump sum payment to the seller before harvesting began as compared to a "pay-as-you-cut" method for 75 percent of the non-assisted sales. Competitive bidding procedures were used on forester-assisted sales which usually resulted in higher returns per thousand board feet (MBF).

The timber left standing after logging is referred to as the "residual stand" and represents the stand's potential future harvests.

The merchantable volume of the residual stand is based on those trees having a diameter of 16 inches or greater measured at 4.5 feet above the ground (DBH). This merchantable volume was twice as great for forester-assisted sales as compared to non-assisted sales.

The value per acre of the residual stand projected to the year 2017 was 1.5 times greater for the forester-assisted sales.

The conclusions from this study are quite obvious. Besides gaining the benefits of free woodland management assistance provided by the IDOC District Forester, those woodland owners marketing timber through forester-assisted sales may receive higher dollar returns per acre now and in the future than those who utilize the "loggers choice" approach.

SOURCE: **Forestry News**, April, 1991; Two Rivers RC&D Project, Pittsfield, IL.

WOOD 'N NICKELS

HOW TO MEASURE TREES TO DETERMINE THEIR VOLUME AND VALUE

In the last issue of our newsletter, we discussed the purpose of a woodland cruise, the type of information that is collected, and the various products which can be processed from harvested logs. If income from periodic timber harvesting is one of the objectives you've set for your woodland, how do you know when it's time to actually begin harvesting trees? Similarly, which trees are ready for harvest and which trees should be left to grow?

To make these determinations, there are basic tree measurements which the forester must take. These include a diameter and height measurement, and an occasional boring of the trunk with an increment bore to assess the tree's past growth performance.

Big trees are not necessarily big because they're old. The quality of the site on which they grow has a lot to do with their size. Not all woodland sites have the same productivity just as all farm fields do not produce the same the yields.

If you were to examine two different white oaks growing on two different sites, it would be difficult to make an assessment of the site's ability to grow trees rapidly just on the basis of their size. If one was noticeably larger, you'd probably assume that this particular site was far superior. This is a common mistake made by landowners.

To determine the quality of the site, the forester must bore a couple **dominant** trees in the stand to determine their age. He/she then determines the total height of the trees. These two measurements are compared to established tree growth curves which enable the forester to make a quick evaluation of the site's potential for tree growth. This is referred to as the **site index**. For central hardwoods, site index is a reflection of the total height a specific tree species would achieve over 50 years of growth. There are numerous site index curves which have been developed for the major species growing in the Midwest. For white oak, a site index of 45 (SI45) means it will attain a height of 45 feet in a 50 year period. The larger the site index for a specific species, the better the site is suited to growing that species. One should not attempt to compare the site index values of two different species to each other. What might be a good site for growing white oak may only be an average site for walnut and so forth.

Once site index is determined, the forester has a good idea of the growth potential of the stand. With this information at hand, he/she can decide what species to favor and begin to develop a harvest schedule for trees in the woodland.

If the woodland has been there for quite some time and the site is poor, chances are good the larger trees have reached maturity and should be harvested. On the other hand, if the site is good, the larger trees may still be putting on good growth, and some of the largest veterans should be considered for harvest. Remember too that the smaller, genetically inferior trees may be the oldest and should be removed to make room for the more thrifty species.

To determine a tree's board-foot volume, the forester must measure its diameter and its height. The diameter measurement is always taken at 4.5 feet above the ground or commonly referred to as **Diameter Breast Height (D.B.H.)**. In instances where sloping ground is encountered, this measurement is always taken on the uphill side of the tree. To determine where D.B.H. hits you, stand erect and have someone measure up your side to a point 4.5 feet above the floor. Remember where this hits you. For the average-height person, this point should be at or near chest level. Tall folks might find it's at belt level, and short folks might find it's at eye level.

The device used by most landowners to measure diameter is called a **scale stick** or **Biltmore stick**. Foresters use these devices for quick measurements, but often rely on a diameter tape when more accurate measurements are needed. The scale stick looks much like a yard stick except

the gradations are smaller. Most scale sticks are calibrated to read the diameter of the tree directly from the stick when it is held 25 inches from the eye.

Have someone help you determine a twenty-five inch reach. Hold a yardstick next to your eye. Hold the scale stick in your hand and extend your reach 25 inches away from your eye. Most folks with average-length arms will have a slight bend at the elbow. Become familiar with the "feel" of this reach.

Here's how use the scale stick to determine the tree's diameter (refer to Figures 1 and 2):

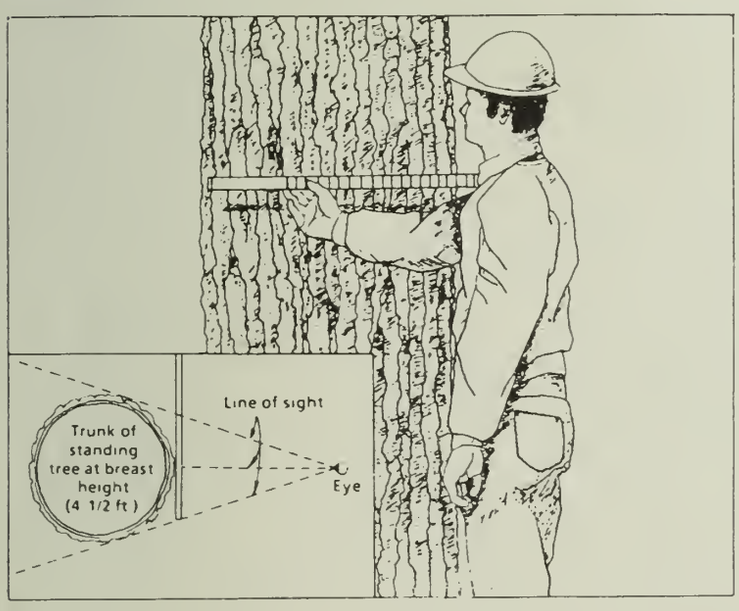


Figure 1.

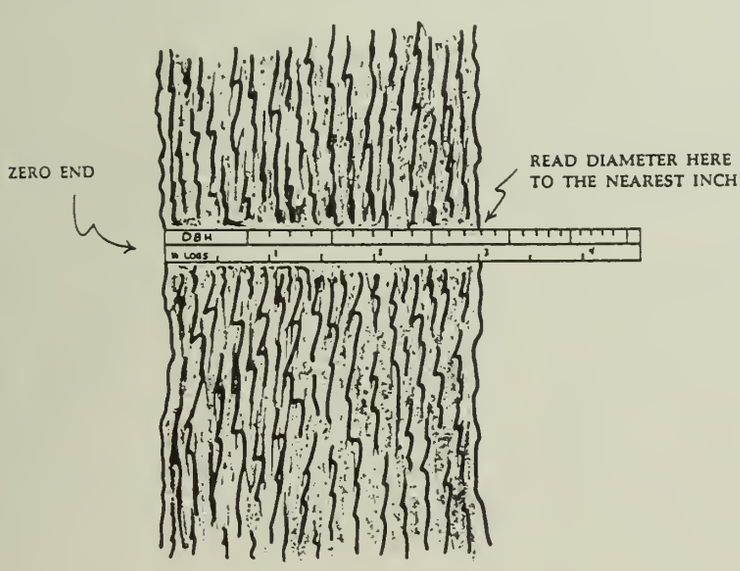


Figure 2.

1. Face the tree and center yourself on its trunk. Move up against the tree to determine where the 4.5 foot mark is on the tree's trunk. Hold the scale stick horizontally against the tree on the 4.5 foot mark, and extend yourself 25 inches away from the trunk.

2. Look directly at the center of the trunk. Now, without moving your head, shift your eyes to the left side of the tree trunk and line the zero end of the stick up with the left edge of the tree.

3. Without moving your head, shift your eyes to the right side of the tree and observe where the right side intercepts the stick. This is the diameter measurement.

4. Because trees are not round, it is good practice to take another diameter measurement one-fourth of the way around the trunk (90 degrees to your first measurement). Average the two measurements.

The volume of a cylinder (in essence a log) is equal to the area of the circular end times the length of the cylinder. So to figure out the board-feet volume of a tree, the second measurement you'll need to take is the height measurement.

In this instance, we are not concerned with the total height of the tree, but rather its merchantable height. Merchantable implies the ability to be used. There are numerous factors which make a log unusable for lumber or veneer. One is the **size of the log**. For economic reasons, mills that harvest sawtimber for lumber generally will not accept logs smaller than 10 inches in diameter (inside the bark) at the small end of the log.

The major factor which influences merchantable height is **tree form**. The first major fork in the tree is a good example. The diameter of the trunk (log) just below the fork may well exceed 10 inches, but the log(s) above the fork generally becomes quite limby and produce very low quality lumber.

Large crooks, bends, or sweep in the trunk also make the log a cull. Noticeable swellings or decayed limbs or holes are also tell-tale signs that the inside of the trunk is rotten and would not produce sound lumber. These factors are known as **defect**.

In summary, merchantable height is controlled by a diameter limit in the upper part of the tree or by some defect occurring on the trunk which renders the wood above unsuitable for lumber production. Making this determination sounds difficult, but with a little practice

you can quickly assess where the merchantable height is on each tree.

The scale stick is used to determine merchantable height in 16-foot logs. Half-logs are 8 feet in length. Here's how to determine merchantable height (refer to Figures 3 and 4):

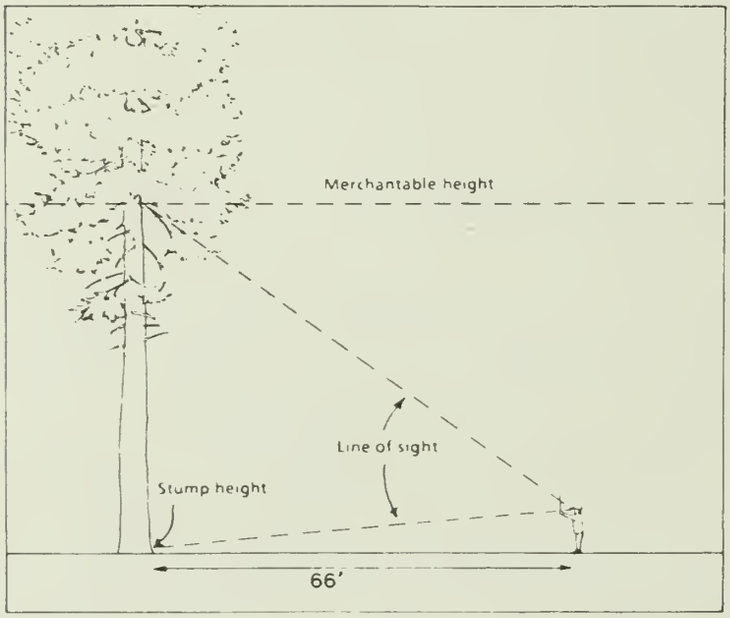


Figure 3.

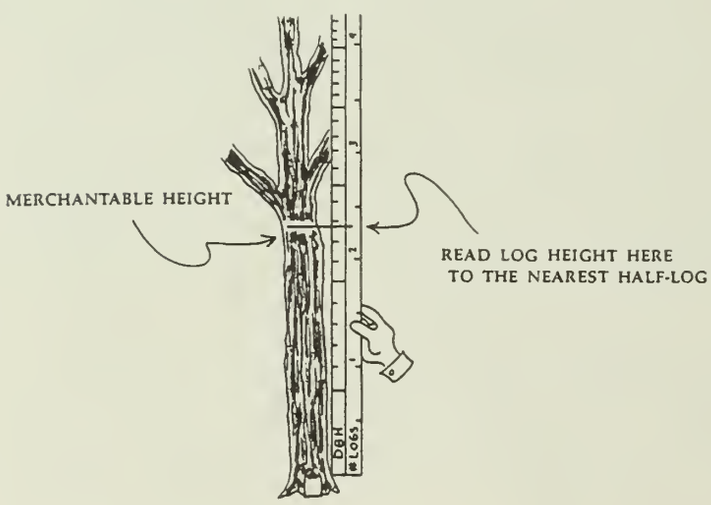


Figure 4.

The scale stick is calibrated to read log heights when you stand 66 feet away from the base of the tree. To do this you'll need a 100 foot tape or know how to pace the distance accurately.

1. Begin by observing the tree on all sides for outward signs of defect. Decide where merchantable height will be measured.

2. Move 66 feet away from the tree in a direction that will give you an unobstructed view of the merchantable height point and the base of the tree. This may be difficult in a woodland with dense undergrowth. You should pay particular attention to pacing or measuring the 66 foot distance on the contour. Flat ground poses no problem, but hilly ground does. Standing above or below the tree on a hill rather than along the contour can lead to wrong height measurements.

3. Prior to moving away from the tree, lean a clipboard with an attached white sheet of notebook paper up against the base of the tree. The white paper will help give you a target when sighting the base from 66 feet.

4. Once you reach 66 feet, turn and face the tree. The scale stick will have graduated markings on its face or the side which represent log and half-log measurements. Hold the stick vertical with the base or zero end lined up with the top of the clipboard. Height measurements are always made with a one-foot stump height allowance. Loggers will not cut the tree flush with the ground and normally leave a stump approximately one foot high. Your arm should be extended 25 inches from your eye. Be sure to hold the stick as vertical as possible. Allowing it to lean toward or away from you can cause major measurement errors.

5. Without moving your head, shift your eyes up to the point where you've determined merchantable height will be measured. Observe where this point intercepts the stick. Read the number of 16-foot logs directly from the stick. Merchantable height should be measured to the nearest half-log.

With these two measurements, diameter and log height, you can determine the board foot volume of the tree using the volume table included in this newsletter. Read along the left side of the volume table to find the correct diameter and across the top to find the number of 16-foot logs. The number where the column and row intersect is the board-foot volume of the tree. In Illinois, both timber buyers and foresters use the Doyle Rule for determining volume.

The board-foot volume you have determine for the tree is an estimate of lumber the logs would yield assuming they were 100 percent sound. You must make an allowance for the defect you have in your woodland. It is unlikely for a young, vigorous woodland to have much rot and decay in the trees, whereas an over-mature woodland may have many large trees with hollow centers. Through a quick visual inspection, a forester can give you a rough idea of the percent defect you might expect to encounter in your woodland.

Once you have adjusted your board-foot volume figure for defect, you can begin to make a determination of what the tree might be worth. You will need to know whether the tree (logs) is veneer or sawtimber grade. There is a dramatic difference in the price per board foot between the two. Again, when you meet with your forester, he/she can point out the characteristics that distinguish a veneer-quality tree (log) from one that will be harvested for lumber. With practice, you will be able to make this determination on the trees on your property. In most cases, the majority of your timber will be harvested for sawtimber. It is a rare case where most of the timber is veneer-quality. Knowing how to distinguish the difference, however, will result in higher profits for you.

Let's assume you have measured a white oak tree and determined it has a volume of 340 board-feet (22 inch diameter and 2 1/2, 16-foot logs with no defect).

Turn to the last page of this newsletter where you will find the most recent Illinois Timber Price reporting sheet. Notice the state is divided up into three zones. Find the zone appropriate for your woodland. The individual species prices quoted on the first page are state-wide average sawtimber prices per thousand board-feet of lumber. On the reverse side are price ranges paid for sawtimber by species within each zone. Stumpage price is the amount paid for standing timber, normally what you would receive. F.O.B. price is what you would receive for the log delivered to the mill.

In our example, the 340 board-foot white oak would be worth $55.40 (stumpage) based on state-wide averages for sawtimber. This figure should be used only as a guide. As pointed out in the reporting sheet, general market and economic conditions are the major price-determining factor. If you have only one tree to sell, it is highly unlikely you would attract any interest from timber buyers, particularly if the tree is growing in or near a residence.

Notice the increase in price paid for veneer (both state-wide and by zone). If you're planning to sell timber in the near future, it would be wise to have a professional forester assist you.

For those of you who would like to try your hand at measuring trees on your property, we have a paper scale stick which can be mounted on a yardstick or piece of lath. It has a self-adhesive back and sells for $1.00. If you would like to order one, please make your check payable to **Department of Forestry** and send it to the newsletter editor's attention.

SELECTED ILLUSTRATIONS from **Timber Management For Small Woodlands**, Goff, Gary R., et al. Information Bulletin 180. Cornell Cooperative Extension Service, Ithaca, NY.

TRACKS features related articles on small game and non-game management for woodland owners. If you have particular questions you would like addressed, please write the newsletter editor. We will incorporate them into **TRACKS** as space permits.

In 1985, we featured an article on managing woodlands for wild turkey. For our new readers, we feel it is appropriate to reprint this article written by Stephen Brady. Steve is a biologist for the USDA Soil Conservation Service stationed in Fort Collins, Colorado, and formerly state biologist for SCS in Illinois.

MANAGING PRIVATE WOODLANDS FOR EASTERN WILD TURKEY

The Illinois Department of Conservation should be given full credit for making eastern wild turkey (Meleagris gallopavo) management a true wildlife management success story in our state. Although turkeys were common in Illinois at the time of settlement, they were literally "hunted out" and vanished from the state around 1903. Efforts to restock turkeys were unsuccessful as game farm raised birds failed to survive when released into the wild. However, wild-trapped turkeys from Mississippi, West Virginia and Arkansas prospered when relocated to

southern Illinois forests in the early 1960's. Successive releases of wild turkeys to other parts of the state have all been made from additional imports from other states or from trapping and relocating birds from the rapidly expanding population in southern Illinois.

Contrary to the reputation turkeys may have for not being very bright, the wild turkey is a very alert, wary bird that is difficult to approach and to call in close enough to get a bead on. Only those sportsmen who are "smart like a fox" (or should we say turkey?) are likely to put a wild gobbler on the dining room table.

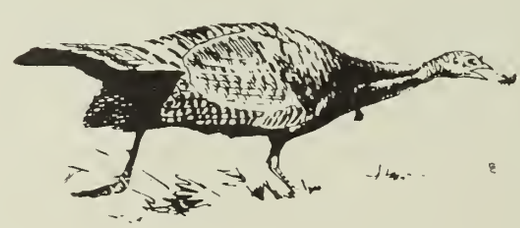
The eastern wild turkey is a bird of mature hardwood and mixed hardwood and pine forests. Land use patterns have a strong influence on population levels and survival rates. Population densities are highly variable but average habitat might have one turkey per 160 acres and good habitat might have one per 40 acres. Much high population densities have been reported from some regions. Although flocks of 10 to 20 birds are common, the typical home range of these birds may be 2,000 to 4,000 acres. They may spend several days in one portion of the range and then move to a different location for several days or weeks. Turkeys spend the night roosting in large trees and will typically have several different roosting sites within their home range. Optimum habitat contains a wide variety of cover types with a large percentage in hardwood forests. Perhaps 50-75 percent of the land in hardwood forest and 12-25 percent in herbaceous openings such as pastures and old fields would be a good mix.

Spring nest sites are usually selected in mixed herbaceous, low brushy cover types such as forest openings and old fields or in areas such as utility line rights-of-way. Nests are usually found near herbaceous openings and near a source of water. It will take the hen about 3 weeks to lay a dozen eggs. Incubation takes 28 days. The hen then leads the young poults into a grassy area where they can feed on insects.

During spring, summer and early fall, the preferred habitat includes semi-open areas such as old fields and timbered pastures. The turkey diet during this period is principally insects and other invertebrates, greens, grass seeds, tubers, bulbs and rhizomes. Habitat preferences shift to the forest interior when mast crops drop in the fall where the principle foods include fruits, nuts, and seeds such as acorns, beechnuts, dogwood, sassafras, hazelnut, viburnums, cherry, hawthorn and other soft mast.

Habitat selection during winter apparently is governed by food resources. Turkeys will utilize waste grains from nearby crop fields if mast crops are not abundant on the forest floor.

How can habitat be improved on farms? First, be sure wild turkeys occur in your area. Subsequently habitat management consists of managing vegetation to improve conditions for turkeys. Improve mast production by girdling or removing trees that shade oak and beech trees. By allowing additional sunlight to reach the trees, mast crop yields will increase. Preserve all understory shrubs as they don't provide any significant competition to mast producing trees and the shrubs all provide valuable food for turkeys and many other wildlife. Two very valuable foods for turkeys are flowering dogwood and hazelnut. Gray or silky dogwood may be useful substitutes for flowering dogwood in northern Illinois since it doesn't occur naturally in this part of the state. Hazelnut and dogwoods can be planted in clumps of 25-50 shrubs (6' x 6' spacing) along woodland edges. Other food-producing, woody plants such as sassafras and hawthorn can also be encouraged along woodland edges by making release cuttings (removing shade sources) or by planting.



Old fields and openings provide important habitat elements needed by turkeys. Most Illinois woodland are fragmented so creation of additional openings is usually not necessary. Further fragmentation could have negative impacts on several other species of wildlife. However, management of the forest edge and existing openings can greatly improve conditions for turkeys. Two vegetative types are needed in these areas–shrubby thickets and grassy areas. The term "old field" accurately describes the condition you want to create. An old field retired from agriculture will naturally go back to native weeds, shrubs and brush. Good turkey nesting cover occurs in these areas where blackberry, greenbriar, hardwood sprouts and shrubs invade. These old fields can be maintained by brush-hogging them about once every three years in late summer.

The second condition for open areas is grassy fields such as permanent pasture or other areas devoted to grasses. What you really want from these areas is to grow desirable turkey foods such as grasshoppers and crickets. Most any grass or grass-legume mixture will be suitable here. Grass seed heads are also good turkey food.

Winter food plots of wheat or corn can be valuable additions to the habitat and will be especially valuable in years when mast crops are sparse or when heavy snows make foraging difficult. Be sure to plant large enough areas so the deer don't eat all of the turkey food. Four to ten acre food plots would be a good size to plan for.

Drinking water should be available on every 160 acres of turkey range. Springs can be developed into watering facilities and small ponds can be constructed in the woods.

Remember that turkeys are wide ranging and unless you own a very large tract of land it's very likely turkey flocks will be moving on and off your property. The more you adapt your land to meet their tastes, the more likely you will find turkeys there.

SELECTED ILLUSTRATIONS by Ned Smith; In: **Woodlands and Wildlife**, Hassinger, J., et al. The Pennsylvania State University, University Park, PA, 1979

and by Donna Curtin; In: **Wildlife Notebook; Sketches of Selected Wildlife in New York State**, Decker, Daniel. Information Bulletin 210. Cornell Cooperative Extension Service, Ithaca, NY, 1988.

A TURKEY FEEDER THAT WORKS

by Gordon Long, Multiple Use Managers, Inc., West Point, CA

Turkeys are among the easiest game animals to supplemental feed. The intelligence of a turkey is often hotly discussed, but anyone who has ever tried hunting them can likely tell stories about being outsmarted by the critters. The point is, turkeys readily accept a feeding program. They're smart enough to realize the benefits of a free, dependable meal. Turkeys have also been known to domesticate rather easily. Here again, maybe they appreciate the virtues of the "good life". Start harassing them with throwing little lead pellets at them and find how quickly they revert to the wild. All I'm trying to say is that turkeys are wonderful animals to work with. They are probably the best example of a species in which to prove how management can really aid that species. If you make a concerted effort to improve a wild turkey population, your efforts will likely be realized. Notice that I was careful to say "wild" turkeys. There are huge differences between wild turkeys and pen-raised birds that look like wild birds. The pen-raised bird is the culprit for the stupidity characteristic often associated with turkeys.

For many years state wildlife departments tried to re-establish turkeys in the wild with pen birds. In almost every case, such a program was a resounding failure. But once trapping of wild birds was established to accomplish the same goal, turkey transplants have been highly successful. The revival of turkeys across the nation has been one of our brightest success stories in the wildlife management field.

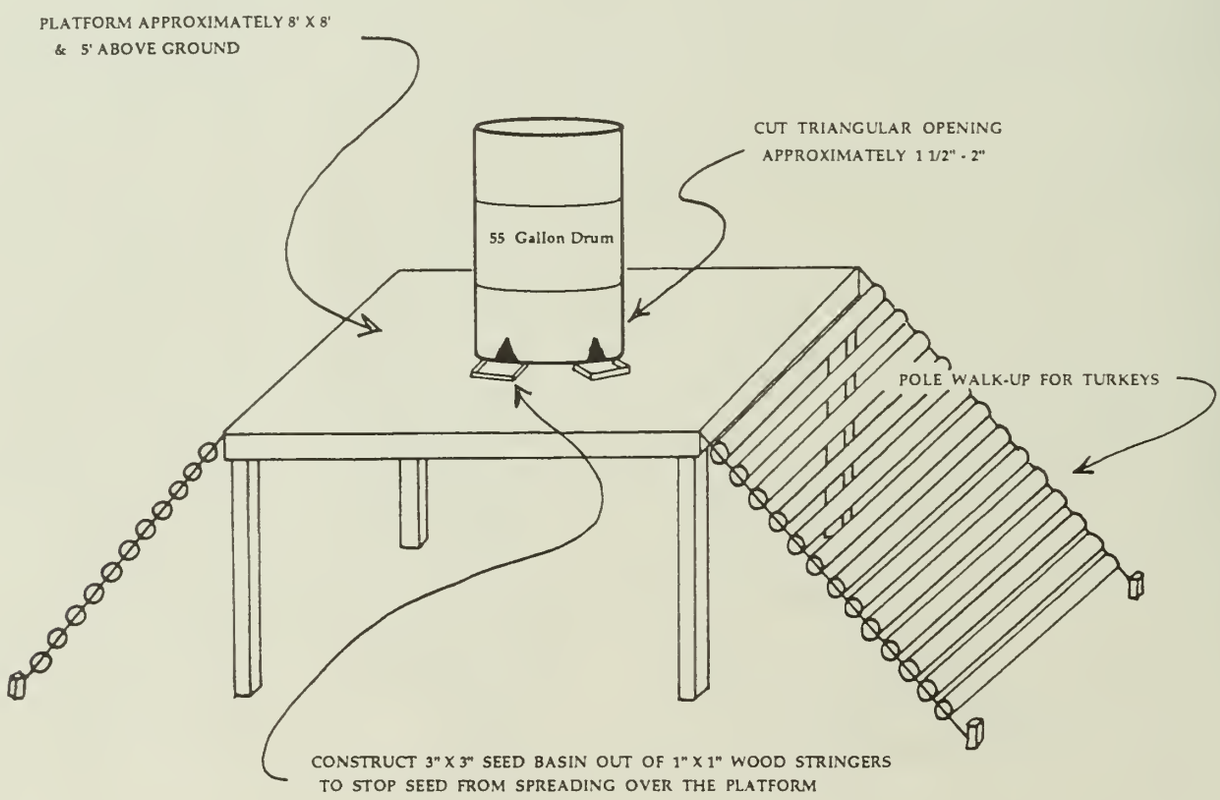
Wait a minute, I've gotten off my topic. With all the background information now done, let's get back to the job at hand--describing a working turkey feeder. Once decided that a bigger turkey population is wanted, the next decision is whether it's worthwhile to buy a prefabricated turkey feeder. These manufactured feeders do work well, but may not be necessary. On a couple ranches that we've worked on, a simple do-it-yourself feeder works really well.

All that is needed is a 55-gallon drum, a platform such as a pallet with a larger plywood cover, some additional wood to elevate the feeder, some narrow slats or pipe to serve as a walkway for the turkeys to reach the platform, and some feed. Simple as it may seem, it's been proven to work.

It goes without saying the feeder should be placed where turkeys are known to frequent such as near roosting sites, feeding grounds, or water.

A couple other things may not be so obvious. First being the reasoning behind putting the feeder up five or six feet in the air. Not only will that keep the cattle away from disturbing the feeder, but by putting it up, it allows the turkeys a line of defense for them to fly off it if a predator happens to show up. As for the ramps, it is advisable to have them since turkeys would rather not fly if they don't have to. And yes, turkeys can walk up metal pipe if it's at least five inches in diameter. The small slats and/or pipe will also deter other animals that you may not want eating up the feed.
Cracked corn is typically used as feed since it is a good nutritional source and is too large for a majority of the songbirds that are around. Large diameter foods are mandatory because small undesirable birds would eat you out of house and home if they could.

TURKEY FEEDER



By cutting a couple rectangular holes in the bottom of the drum to serve as a feed reservoir, gravity will allow the feed to spread out a bit onto the platform. You may want to nail a frame around the hole to control the flow, but normally isn't required if the holes aren't too large. An advantage of some manufactured outfits is that they typically have some sort of dispersal technique. Whether it's battery or solar powered, it is a handy feature. However, these feeders don't have a reservoir as large as a 55 gallon drum, so you'll have to replenish it more frequently.

You need to read your state's particular regulations on how close you can legally shoot near a feeder. The feeder will invariably concentrate the birds more.

Turkey hunting has to be one of the fastest growing gun sports there is today. If you don't already have turkeys on your property and you think the proper habitat is there, contact your state wildlife agency. They are usually open to discuss a possible transplant.

REPRINTED WITH PERMISSION from: **The Game Manager**, Volume 6, No. 10, Multiple Use Managers Inc., April, 1991.

EDITOR'S NOTE: THE GAME MANAGER newsletter is written by Multiple Use Managers, Inc., a private consulting firm, and is intended to provide private landowners and game managers with innovations and information on game management which includes harvesting (hunting). By Illinois law, all feeders and any remnants of feed would have to be removed from the property 10 days prior to any hunting on the property. If you do not hunt and do not allow hunting on your property, there is no reason to remove the feeder during turkey season(s).

If you want more information on supplemental feeding and its relationship to hunting regulations please contact your local IL Conservation Police officer or IL Department of Conservation office.

CHEMICAL REPELLENTS FOR REDUCING ANIMAL DAMAGE BY DEER, RABBITS, AND MICE: ARE CONSUMERS BEING RIPPED OFF?

by Tom Barnes, Department of Forestry, University of Kentucky, Lexington, KY

Note: Trade names are used for simplicity. No endorsement is intended, nor criticism implied of similar products not named.

You planted a beautiful apple orchard in the backyard and suddenly you discover the trees are being browsed on! What do you do? You call your local county agriculture adviser, horticulture specialist, conservation officer, wildlife biologist, or local agricultural farm supply store and they advise you to use a chemical repellent to stop deer rabbits, and rodents from chewing on those precious trees. You search through every hardware, garden, nursery, or farm supply store to find only one repellent is available. So you buy it and apply the chemical according to directions on the label. After several agonizing days you inspect your trees again only to find the damage has not stopped. Assuming you applied the repellent according to the directions, did you get bad advice or were you ripped off? The answer is probably no to both questions. Current research is shedding light on the subject of chemical repellents.

Repellents are usually placed into two categories: **Area** and **Contact**. Area repellents are applied next to plants and usually repel by smell alone. Examples of area repellents used by homeowners and professionals include: **Magic Circle** (bone tar oil), **Hinder** (ammonia soaps of higher fatty acids), human hair, bar soap, blood meal, cat/dog feces, or putrefied meat scraps. Contact repellents are applied directly to plants and repel by creating an unpleasant taste for the animal. Examples of contact repellents include: **Big Game Repellent (BGR)**, **Deer-Away** (putrescent egg solids), **Ro·Pel** (Benzyldiethyl ammonium saccharide), **Miller Hot Sauce** (capsaicin, and extract of hot peppers), **Gustafson 42-S**, **Chaperone** and **Chew-Not** (Thiram).

The effectiveness of repellents depends on a number of factors. Many repellents do not weather well and must be reapplied after a rain, heavy dew, or growth of new plants to be effective. The amount of preferred food available to the animals also affects a repellent's effectiveness. If the deer, rabbit, or rodent population is high and under food stress, repellents will probably be less effective. Not every repellent will be effective in every situation. In some cases an area repellent may be most effective, whereas in other

situations a contact repellent may be the chemical of choice.

Always follow the manufacturer's directions and label instructions before applying the chemical. Never apply repellents to any portion of a plant likely to be eaten by humans unless the label permits it.

During the dormant season apply contact repellents when temperatures are above freezing. Be sure to treat young trees completely and older trees to height of 6 feet if deer are causing the damage. If you are having problems during the growing season, apply a contact repellent at about half the recommended concentration. **Repellents will not eliminate all damage. The success of repellents is measured by how much the damage is reduced.**

A variety of laboratory and field trials have been conducted during the past decade to find out which chemical repellents are the most effective. The following discussion is a summary of the seven most current research studies published between 1983 and 1990. Most studies were conducted in the northeastern United States using deer or mice as experimental animals.

Several early studies done in 1983 evaluated as many as 14 different repellents and concluded the following showed promise in reducing deer damage: **Hinder, BGR, Miller Hot Sauce, Feather Meal**, and Thiram. Another study conducted the same year using four of the above compounds concluded that **BGR** was consistent in reducing damage. They also observed daily differences in chemical effectiveness. The following year another study indicated **BGR, Hinder,** and Thiram reduced damage 46, 43, 43 percent respectively over a three year period. Other compounds tested (human hair, **Magic Circle**, and **Miller Hot Sauce**) reduced damage from 15 to 34 percent. A cost analysis revealed **BGR** cost $990.00/ha ($2445.30/acre) to apply, Thiram $555.98/ha ($1373.27/acre), **Hinder** $75.98/ha ($187.67/acre), **Magic Circle** $74.50/ha ($184.02/acre), and **Miller Hot Sauce** $26.20/ha ($64.71/acre).

The same authors published several papers in 1987 and results from one study indicated there was no difference in damage reduction between human hair and **BGR**. Both substances reduced damage less than 50 percent. A similar study revealed **BGR** and **Hinder** both reduced damage by approximately 50 percent. However, the author concluded that it was much cheaper to build an electric fence (by approximately $500.00/ha or $1235/acre) than it was to apply **BGR** to the orchard trees. The last study conducted in 1990 showed a 78 percent reduction in the amount of damage when Thiram was applied.

Because of the expense of using manufactured chemicals, many homeowners use novel ideas to reduce animal browsing. One of the ideas commonly used in many midwestern states is to hang bars of soap on wire around sensitive areas. A new study just recently published indicated soap reduced damage by 37.6 percent and was only effective when placed within three feet of the actual site of damage. In addition, the authors tested eight different brands of soap and found no difference between brands. Surprisingly, browsing within three feet was reduced by 70 percent when just the soap wrappers were used. This indicates soap may be more of a visual repellent. The results from this study also indicated that **BGR** was the best of commercial repellents tested whereas **Ro:Pel** did not reduce damage at all. A cost analysis, including labor, indicated soap was just as expensive to apply as was **BGR**.

What does all of this mean and is the consumer getting ripped off when a repellent is recommended. A quick summary would indicate that repellents **will not** eliminate the damage completely. A homeowner must decide if 50 to 75 percent reduction in damage is acceptable. Additionally, contact repellents are more effective than area repellents. Not every repellent will work in every situation. Results from these research data show wide variability in the effectiveness of chemical repellents. It appears, however, that commercial repellents are more effective than home remedies (human hair, soap). Finally, a cost/benefit analysis of all possible solutions should be considered.

If you are having continual problems, it may be cheaper to build a fence. Consumers should consider the nature of repellents and understand all the variables affecting the efficacy of a repellent before investing time and money in them.

REPRINTED from: **Natural Resources Newsletter**, Volume 10, No. 3, University of Kentucky Cooperative Extension Service, Fall 1990.

Bugs 'n Blights

DOGWOOD DISEASE CAUSED BY A NEW FUNGUS

WASHINGTON--The cause of the mysterious disease that has been killing dogwood trees in the northeast has been found by a U.S. Department of Agriculture scientist.

"A new parasitic fungus has been identified as the cause of the disease, known as dogwood anthracnose," said Scott C. Redlin of USDA's Agricultural Research Service.

Redlin said the newly identified fungus, in the genus *Discula*, has been attacking the flowering dogwood; *Cornus florida*. Details of the fungus will be reported in the journal Mycologia later this year. Another species of dogwood native to North America called Pacific dogwood *(Cornus nuttallii)* is vulnerable to the disease. Japanese dogwood *(Cornus kousa)* is a host to the fungus, but is resistant to the disease.

"Identifying the organism was the first step in solving the dogwood dilemma. Now that we know which fungus is causing the disease, the next step is to develop methods to control it," said Redlin.

"Disease symptoms include leaf spots and twig dieback on dogwoods. It attacks the flowers first and then the bracts--the four `petals' we see when the tree is in bloom."

Often lethal, the disease forms cankers as it girdles the tree's trunk. "Any plant parts it attacks die rapidly," Redlin said.

Dogwood anthracnose first appeared simultaneously in the mid-1970's in Seattle, Washington, and Long Island, New York. It has devastated native dogwood stands in the northeastern U.S. and is spreading into the southern states.

Outbreaks of the fungus disease depend on the geographic distribution of the dogwood tree. Redlin believes the fungus was introduced to the United States from nursery stock. Ornamental dogwoods are imported from other continents.

With its picturesque white or pink blossoms, the dogwood is one of the nation's most highly prized landscape ornamentals and fosters a multimillion dollar tourist industry in the southeast. Dogwood fruits and twigs are also an important food source for wildlife.

Redlin, a plant pathologist at the Systematic Botany and Mycology Laboratory in Beltsville, Maryland, has been studying dogwood anthracnose since 1988. His goal: to differentiate this fungus from others found on dogwoods.

"Most of the year the fungus is hidden within the trees. As the dogwoods leaf out in spring, the fungus also emerges," said Redlin. "It is then we see the fungus as it develops on infected plants."

To identify the fungus, Redlin needed to examine it under the microscope. He studied the tiny raised bumps called fruiting bodies that produce spores--which is how the fungus reproduces.

He then grew the fungus on different culture media in the laboratory, including oatmeal, cornmeal, malt and potato dextrose agar. *"The fungus reproduced best on oatmeal," Redlin said. "But it's easiest to identify on potato dextrose agar."*

The millions of infectious spores are believed to be dispersed by splashing rain. Under dry conditions, the spores form threads (cirrhi), which may be dispersed by the wind.

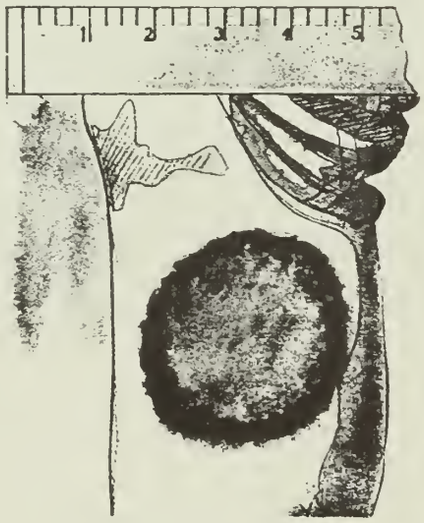
SOURCE: USDA News Feature, April 22, 1991.

DEER TICK INCIDENCE IN ILLINOIS

Adult deer ticks have been found on people in northern Illinois this spring. They are about one-eighth inch in diameter and usually reddish in color. Both this stage and the nymph stage can transmit Lyme disease to humans. Nymphs started appearing in May and will be present most of the summer. They are much smaller than the adults, being the size of a pinhead. As with all ticks, deer ticks are most likely to attach to the skin on the lower body. The nymph tends to attach in the groin area.

Deer ticks are most likely to be picked up in the northwestern and northcentral portions of Illinois, although occasional ticks have been found in other parts of the state, particularly in the northern half. There is some evidence to suggest that other species of ticks can occasionally transmit Lyme disease, although this is very rare. To be on the safe side, precautions should be taken against ticks whenever one is out in natural areas, particularly wooded areas.

Protect yourself from deer ticks and other ticks by wearing long pants and tucking your pantlegs into your socks so that the ticks cannot reach you skin easily. Wear light-colored clothing so that the ticks can be seen more easily. Apply an insect repellent containing **DEET** to your skin, particularly you lower legs and ankles. Some commercial repellents which contain DEET are (% concentration in parenthesis): Regular Formula OFF! (15%), Deep Woods OFF! (20%), Muskol (25%), Cutter (18%, 21%, 27%, 31%, 95% and 100%), Repel (52% and 100%), Tecnu (100%), Ticks OFF! (38%). Clothing can be sprayed with **Permanone**, an insecticide that will kill any ticks that get on the clothing. Do not spray the Permanone on your skin and take care to avoid inhalation of the insecticide or contact with your eyes. Permanone is not readily available in stores, but you may be able to find it in some sporting goods or farm supply stores. One source is Forestry Suppliers, Inc. in Jackson, MS. Their phone number is 1-800-647-5368. The product stock number is 25221 and is called Permanone Tick Repellent.



The appearance of the *erythema chronicum migrans* (ECM) rash is unique to Lyme disease - and can be a major indicator of the disease to you and your doctor, It usually appears as a flat or raised, red area, with a ring-like border around a pale center. The size of the rash may be from three quarters of an inch to 26 inches in diameter.

Every few hours, check yourself for ticks, particularly at the end of the day. Ticks need to be attached for at least 24 hours to transmit Lyme disease. If ticks are found, grasp the head where it enters the skin with tweezers and pull it out slowly and steadily. Apply an antiseptic to the bite. If tweezers are not available, pull the tick out with your fingers. Protect the skin of your fingers from any tick secretions by using a tissue. Other methods of removing ticks usually kill the tick, resulting in part of it remaining in the wound. You may wish to save the tick for identification by putting it in rubbing alcohol.

If you would like more information on deer ticks and Lyme disease, please write the newsletter editor. We have factsheets produced by the Entomology Extension and the IL Department of Health which we will send you. You also can write for an excellent Lyme disease brochure produced by Lederle Laboratories. Their address is Lederle Laboratories, Public Affairs Department, 1 Cyanamid Plaza, Wayne, NJ 07470. Indicate you would like a copy of their Lyme disease publication.

SOURCE: **Home, Yard & Garden Newsletter**, No. 5, May 1, 1991; Illinois Cooperative Extension Service, Urbana.

SELECTED ILLUSTRATION from: Lyme Disease...Be Aware - Knowledge is Your Best Defense. Lederle Laboratories, Wayne, New Jersey, 1989, Page 8.

The listing of manufactured repellents (or their omission) or companies selling these products does not imply endorsement or rejection of the product by this newsletter or the IL Cooperative Extension Service. The information provided is merely a service to our readers.

DOYLE TREE SCALE

DBH	Number of 16-foot Logs						
	1/2	1	1 1/2	2	2 1/2	3	3 1/2
	Contents in Board Feet						
12	20	30	40	50	60		
14	30	50	70	80	90	100	
16	40	70	100	120	140	160	180
18	60	100	130	160	200	220	240
20	80	130	180	220	260	300	320
22	100	170	230	280	340	380	420
24	130	220	290	360	430	490	540
26	160	260	360	440	520	590	660
28	190	320	430	520	620	710	800
30	230	380	510	630	740	840	940
32	270	440	590	730	860	990	1120
34	300	510	680	850	1000	1140	1300
36	350	580	780	970	1140	1310	1480
38	390	660	880	1100	1290	1480	1680
40	430	740	990	1230	1450	1660	1880
42	470	830	1100	1370	1620	1860	2100

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AGRICULTURAL
STATISTICS SERVICE

P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4295
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Springfield, Illinois 62706
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July 5, 1991

PRICES PAID ILLINOIS TIMBER PRODUCERS NOVEMBER 1990 THROUGH FEBRUARY 1991

PRICE REPORTING ZONES

Winter sawtimber prices paid Illinois timber growers were generally lower than a year earlier for both stumpage and FOB. Of the timber buyers reporting volume of their 1990 operations, 45% indicated their volume was 500 thousand board feet or higher. This was up from the 1989 percentage of 41%.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	November 1989-February 1990		May 1990-August 1990		November 1990-February 1991	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	138	298	148	286	129	245
Basswood	67	150	72	139	61	165
Beech	44	119	47	122	47	120
Cottonwood	37	119	43	122	40	113
Sweet Gum	44	122	48	128	49	125
Elm & Hackberry	48	124	52	130	47	123
Hickory	54	140	56	136	46	131
Soft Maple	55	142	58	139	53	137
Sugar Maple	66	170	71	160	57	136
Black Oak	106	192	103	170	92	174
Pin Oak	53	125	53	130	51	125
Red Oak	180	325	167	289	153	276
White Oak	173	284	167	282	163	271
Yellow Poplar	84	188	95	202	72	179
Sycamore	42	119	48	127	43	120
Black Walnut	322	542	307	508	302	531
Woods Run Bottomland	56	136	63	136	59	135
Woods Run Upland	106	157	112	169	94	177

FACE VENEER PRICES $ PER M BD. FT.

Red Oak	579	876	426	737	371	629
White Oak	977	1,350	853	1,351	744	1,400
Walnut	1,529	1,943	1,171	1,886	1,709	1,890

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	November 1989-February 1990		May 1990-August 1990		November 1990-February 1991	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	1.90	12.95	1.59	13.00	1.90	13.00

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	205	405	194	401	178	330

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
November 1990-February 1991

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
				Dollars			
1. Sawtimber							
Ash	M bd. ft.	50 - 200	120 - 350	60 - 250	150 - 500	50 - 200	115 - 300
Basswood	M bd. ft.	--	150	30 - 80	110 - 200	30 - 100	110 - 280
Beech	M bd. ft.	30 - 40	100 - 125	40 - 60	100 - 140	--	150
Cottonwood	M bd. ft.	30 - 50	100 - 135	20 - 60	90 - 130	20 - 60	100 - 150
Sweet Gum	M bd. ft.	20 - 70	100 - 140	40 - 60	100 - 140	--	150
Elm & Hackberry	M bd. ft.	20 - 60	100 - 140	25 - 60	90 - 150	20 - 100	100 - 150
Hickory	M bd. ft.	30 - 100	100 - 200	20 - 60	110 - 150	20 - 100	100 - 150
Soft Maple	M bd. ft.	30 - 75	100 - 160	30 - 80	120 - 160	30 - 100	150 - 160
Sugar Maple	M bd. ft.	30 - 75	100 - 160	30 - 80	120 - 180	30 - 100	110 - 150
Black Oak	M bd. ft.	30 - 180	130 - 300	50 - 200	120 - 220	40 - 100	140 - 160
Pin Oak	M bd. ft.	30 - 120	100 - 135	20 - 100	100 - 160	30 - 100	100 - 150
Red Oak	M bd. ft.	60 - 250	200 - 400	55 - 220	120 - 400	80 - 350	115 - 500
White Oak	M bd. ft.	60 - 275	200 - 400	50 - 300	150 - 400	90 - 250	115 - 500
Yellow Poplar	M bd. ft.	50 - 150	120 - 235	40 - 100	140 - 200	--	150 - 240
Sycamore	M bd. ft.	20 - 60	100 - 135	25 - 70	90 - 150	20 - 60	100 - 150
Black Walnut	M bd. ft.	100 - 400	300 - 600	100 - 550	230 -1000	100 - 500	200 - 800
Woods Run Bottomland	M bd. ft.	30 - 100	120 - 170	40 - 120	110 - 160	30 - 75	125 - 150
Woods Run Upland	M bd. ft.	70 - 150	120 - 225	40 - 200	120 - 215	80 - 160	150 - 250

		STATEWIDE	
		Stumpage	F.O.B.
2. Face Veneer			
Red Oak	M bd. ft.	100 -1,000	200 - 950
White Oak	M bd. ft.	500 -2,000	900 -1,800
Walnut	M bd. ft.	1,000 -3,500	2,000 -2,500
3. Pulpwood			
Unpeeled	Ton	1.50 - 2.00	13.00
4. Cooperage			
White Oak	M bd. ft.	100 - 300	200 - 400

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	97
Scribner	3
International	-

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	21	100 - 250
Zone 2	33	100 - 175
Zone 3	46	130 - 250
ILLINOIS	24	100 - 250

VOLUME OF 1990 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	19	43	42	37
100 - 500	19	19	17	18
500 -1,000	38	19	17	23
1,000 -3,000	19	11	14	14
3,000 +	5	8	10	8

Cooperage is the manufacture of barrels. Face veneer: Logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers.

MARKED TIMBER SALES - NOVEMBER 1990 - FEBRUARY 1991

	STATEWIDE STUMPAGE*
Woods Run Upland	$102 - $187/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Gerald L. Clampet
State Statistician

Kevin Barnes, Garry D. Kepley,
Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 2, 1991 No. 21

Illinois Forest Management Newsletter is produced by the Univeristy of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, 110 Mumford Hall, 301 W. Gregory Dr., Urbana, IL 61801.

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Your Values, Your Choices

The Illinois Forest Stewardship Program

This time last year, our newsletter heralded the coming of a new program for forest landowners in Illinois. Now we're pleased to announce the arrival of the **Illinois Forest Stewardship Program.**

We titled this article ***"Your Values, Your Choices"*** because that's what the Forest Stewardship Program is all about. It's a nationwide program designed to encourage landowners to actively manage their woodland properties for the values they hold dear.

Your values are important. They are the key to the choices you will make for your woodland's future. No two landowners have the same values for their woodland. Some see it as a living bank account which can offer periodic sources of income during the working years, and stability and financial security at retirement or as a college fund for grandchildren. Others see it as haven for wildlife and natural beauty. And still others revere it for the personal solitude and amenities it offers, such as clean air and water. But throughout the vast weave of values and reasons for owning a woodland is a common thread which all stewards of the land possess—*pride in ownership*. Pride bountiful enough to say, ***"I care about my land and I want to make it a better place for those who will follow me."***

Conservation of our natural resources is the basis for good land stewardship. We hear much today about the need to preserve our natural resources. To a steward, conserve might be a better choice of words. Preserve implies a static state; non-use. Conserve connotes "wise use". To use resources wisely does not necessarily imply consumptive use—often a threatening thought to many landowners.

It's nieve to think that we can preserve a dynamic ecosystem such as a forest where change, however small, takes place every day. However, through proper management and good stewardship practices we can conserve and protect our

woodlands for future generations and still enjoy their use in our lifetime.

Stewardship begins by recognizing the many values and benefits that can be derived from your woodland. The stewardship ethic grows as you decide how best to manage your land to enhance your values. And stewardship manifests itself in the pride and personal satisfaction of knowing your vision and care for the land will leave it in better condition for future generations.

Why do you value your woodland? What do you expect from it? You must answer these questions first before you can develop any kind of action plan. Similarly, you must understand the limitations of your land. It is possible the expectations you have may not be compatible with the physical resources available to you.

As an example, let's say you're a rural homeowner who lives on 10 acres of wooded property bordered on one side by a county road and agricultural fields on the other sides - a situation not atypical of many woodland properties in Illinois. You have a great interest in attracting wildlife to the property; particularly, wild turkey.

In this instance, your expectation to manage the property for turkey is most likely doomed to fail since the physical size of your woodland is not compatible with the bird's habitat requirements. Turkey's need an average of 160 acres of mixed woodland and herbacious openings per bird. With optimum habitat available, 40 acres might sustain a single bird. A flock of 10 to 20 birds frequently requires a home range of 2,000 to 4,000 acres. Without protected travel lanes to link your woodland up with larger nearby woodland properties, it is highly unlikely you will attract turkeys to your property.

We've built a case many times in past newsletters, and probably will do so in future issues, for the need to employ the services of a professional resource manager to help you determine whether your expectations for the land are feasible or not. Your DOC district forester and private lands biologist, SCS district conservationist, county Extension adviser, or private consultant are examples of professionals available to help you make these determinations.

Once you've determined your expectations can be met, the next step is to develop a plan to achieve them. A stewardship plan serves as a guide for taking care of your woodland. Your stewardship plan is a road map to the future. Over the next 10, 20, or 100 years, the quality and quantity of trees, wildlife, and other natural resources on your property will be based on the decisions you make today. You must begin to appreciate that your woodland and all adjoining lands are part of an important ecosystem, and that anything you do today will have an impact tomorrow. The Illinois Forest Stewardship Program can help ensure your decisions will be in your property's best interest.

Our lives are driven by economics. Everything we do or don't do has a cost associated with it. Unfortunate as it may be, this is a fact of life.

The Forest Stewardship Program is designed to help private forest landowners minimize their out-of-pocket expenses associated with the management of their woodland or other eligible land. This part of the program is called the **Stewardship Incentitives Program** (SIP). Cost-share payments are available to landowners for specific practices necessary to implement their stewardship plan. These include the costs for:

*** the development of a stewardship plan;**

*** reforestation, afforestation, and natural regeneration (includes cost of seedlings, site preparation, tree shelters, vegetation control, fencing, etc.);**

*** forest and agroforest improvement;**

*** windbreak establishment, maintenance and renovation (includes farmstead and field windbreaks, and living snowfences);**

*** soil and water protection and improvement;**

*** riparian and wetland protection and improvement;**

*** fisheries habitat enhancement;**

*** wildlife habitat enhancement;**

*** forest recreation enhancement.**

To qualify for SIP cost-share payments, a stewardship plan is required. This plan must be developed by a professional resource manager and approved by your local DOC district forester. Cost-share assistance will vary according to the practices and the number of landowners who are accepted into the program. Two allocations totalling approximately $400,000 have been made to Illinois to fund SIP cost-share payments for a two-year period. No landowner will be

eligible for more than $10,000 of SIP funds in any one fiscal year. Land enrolled in the Conservation Reserve Program is not eligible for SIP payments. Similarly, cost-sharing is not available for trees established for orchard, ornamental or commercial nursery, or Christmas tree production.

We encourage you check out this new program. Eligibility is simple.

You must:

*** be a private, non-industrial forest owner (this includes land capable of growing trees);**

*** have at least 5 acres of contiguous woodland (or land to be planted to trees) without a building and not more than a 1000 acres of woodland; or 2 acres protected and served by a windbreak.**

You cannot have:

*** the specific acreage under consideration for SIP payments enrolled in the Conservation Reserve Program.**

*** started a specific SIP practice on your property prior to receiving approval from the governing agency.**

Don't pass up this great opportunity to do the things you've always dreamed of doing with your land. The Forest Stewardship Program will help make those dreams a reality! **For more information about the Forest Stewardship Program contact your local Illinois Department of Conservation office or USDA-ASCS office.**

SIGN UP TODAY AND JOIN THOUSANDS

Stewardship FOREST

OF AMERICANS WHO ARE SHOWING THEY CARE ABOUT OUR FUTURE!

Nationwide Stewardship Videoconference to be Aired

On February 15, 1992, a live videoconference on Forest Stewardship will be aired via satellite from Oklahoma State University in Stillwater. The videoconference is targeted to landowners who are interested in taking advantage of professional and financial assistance through the forest stewardship effort. This videoconference will be broadcast nationally and will provide an introduction to the Forest Stewardship Program and the Stewardship Incentives Program (SIP). Several "certified" stewardship forests in Oklahoma, Minnesota, and North Carolina will be featured. The videoconference will explain how landowner's can enroll in the programs. The most up-to-date information from Washington, D.C. about SIP will be presented. Experts will be in the studio to answer questions from participants viewing the broadcast from around the nation.

There is no charge for the program and anyone with access to a satellite dish can view the program. **The viewing time for Illinois landowners will be 10:00 - 11:30 a.m. Central Standard Time. The satellite coordinates are Galaxy 6, Channel 22.** During the program the viewing audience can call in their questions using a 1-800 number which will appear on the screen. A test pattern will be broadcast one-half hour before the program begins. Anyone having difficulty receiving the signal the day of the broadcast can call (405) 744-3486.

If you own woodland property and a satellite dish, plan on tuning in on February 15. If you have neighbors who might be interested in participating in this new cost-share program, invite them to join you in viewing the program.

Forestry Cost-Share Opportunities are Plentiful in Ilinois

When it rains, it poors! That's how many Illinois woodland owners feel, and most will admit they've never had it so good. Five federal and state programs now offer professional forestry assistance to landowners who want to improve their woodland's productivity or convert marginal crop land to trees. These programs include the *Agricultural Conservation Program (ACP)*, the *Forestry Incentives Program (FIP)*, the *Stewardship Incentive Program (SIP)*, the *Conservation Reserve Program (CRP)*, and the *Illinois Forestry Development (Act) Program (FDA)*. With so many opportunities available, it's easy to become confused. Let's take a brief look at the purpose of each program and where you can go for more information.

Agricultural Conservation Program

ACP is a *conservation-oriented incentive program* for landowners who want to restore and protect their property by decreasing erosion, protecting water supplies, reducing farm-related water pollution, and planting forest vegetation for conservation purposes or improving existing forest land. This is a federal program administered through the USDA-Agricultural Stabilization and Conservation Service (ASCS) office and technical assistance is provided by the IL Division of Forest Resources. To qualify, a landowner must be an agriculture producer and possess an SCS-approved conservation plan. *Contact your county ASCS office for more information.*

Forest Incentives Program

FIP is federal cost-share progam administered through the ASCS office with technical support provided by the IL Division of Forest Resources. *This program is targeted specifically at private woodland owners who want to manage their timber for wood production.* Cost-share payments are available to help landowners increase and improve future wood yields from their woodland. FIP is not available to all counties in Illinois. Certain counties have been designated FIP counties by the Forest Service and the IL Division of Forest Resources. In eligible counties, landowners must have land that meets certain productivity levels, and they must have a forest management plan approved by the IL Division of Forest Resources. Landowners receiving cost-share payments must stay in the program at least 10 years. *For more information contact your county ASCS office.*

Stewardship Incentive Program

SIP is a new program authorized by Congress in the 1990 Farm Bill. *It is designed to encourage private landowners to actively manage their woodlands for multiple benefits. This may include timber production, but does not require it.* Landowners must have a forest stewardship plan approved by the IL Division of Forest Resources and own at least 5 acres of contiguous woodland without a building. SIP requires landowners to stay in the program at least 10 years after cost-share payments are made. *For more information contact your county ASCS office or your local Department of Conservation office.*

Conservation Reserve Program

This federal program was first authorized in the 1985 Farm Bill and amended in the 1990 Farm Bill. *CRP is an incentive program to encourage landowners to convert highly erodible land (HEL) from agriculture commodity production to less intensive uses, such as pasture, permanent grass, legumes, forbs, shrubs and trees.* Landowners will receive rental payments for land accepted into the program and are eligible for cost-share payments for woodland establishment and care. Rental payment contracts extend for 10-15 years depending on the practice. This program is administered by ASCS and technical assistance is available from SCS and the IL Division of Forest Resources. *Contact your county ASCS office for more information.*

IL Forestry Development Act Program

FDA is a state cost-share program available to landowners with at least 5 acres of contiguous woodland without a building, and a forest management plan approved by the IL Division of Forest Resources. *This program provides payments for forestry practices to increase wood production, to improve the quality of existing timber, and to establish new forests.* Landowners qualifying for the FDA program are also guaranteed a reduction in their tax assessment on the woodland acreage and land planted to trees. The tax assessment rate for forested acreage is reduced to one-sixth of the assessment rate of comparable crop ground. This program is administered by the IL Division of Forest Resources. *For more information contact your local IL Department of Conservation or county ASCS office.*

Forestry and conservation practices can be expensive. These cost-share programs offer great opportunities to help landowners recover certain costs which otherwise might have to

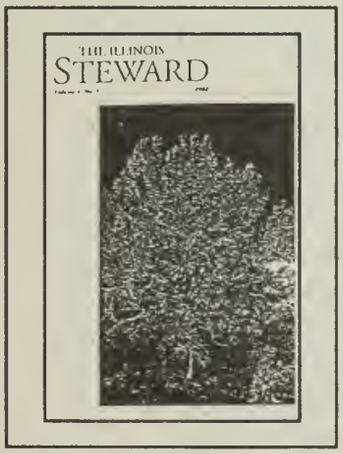
be absorbed or carried until timber is harvested. Another interesting feature of these programs is that you may qualify for cost-sharing under more than one program. In Illinois, you can combine one federal program (ACP, FIP, SIP, and CRP) with the Illinois Forestry Development Act Program. This makes the combined cost-share percentage very attractive and can leave you with very little out-of-pocket expense.

Obviously, as more landowners become aware of these incentive programs, the demand for professional forestry assistance will increase. Many DOC foresters are experiencing backlogs because of the heavy demand for their services. Private consultants are available to help you develop a management plan for your woodland. Cost-sharing is available through the SIP and FDA programs to help defray the cost of having a plan developed by a private consultant. ***For a printed list of these individuals, contact the IFM Newsletter editor.***

Above all, we encourage you to remain patient and exercise caution if you're planning changes in your woodland in the near future. Poor decisions can have a marked affect on your woodland's future health and productivity.

New Stewardship Magazine Available

The Illinois State Stewardship Committee would like to announce their new quarterly magazine entitled *The Illinois Steward.* This magazine focuses on the stewardship aspects of natural resources management through articles on forest management, wildlife, aesthetics, recreation, Illinois natural history, threatened and endangered species, agriculture, soil and water conservation, wetlands, and urban forestry.



A complimentary copy of this full-color magazine is available upon request. We encourage you to write for a copy. The subscription rate is $10.00 per year. It would make an excellent gift for someone you know who's dedicated to caring for the land.

To request your complimentary copy, please fill out the enclosed order form and return it today.

SilvaScene

SILVASCENE features articles related to the art and science of growing trees. With all the tree planting efforts that are going on around the country, many landowners who want to plant trees are finding the supply is very limited. This column features an article on how to grow your own seedlings from seed. **This article is edited and reprinted from IL Cooperative Extension Service Circular 1219, *"Growing Illinois Trees From Seed"*, 1983 by Celia Hooper and Ted Curtin.**

Growing Your Own Tree Seedlings From Seed

Growing your own trees from seed can be enjoyable and rewarding. Watching trees grow from the seeds you have planted will give you a sense of pride as well as a practical lesson in natural history. By carefully selecting the seeds you plant, you will have control over the quality of your future trees. You will also be able to produce trees that are particularly well adapted to your local growing conditions, have especially high growth rates, resist disease, produce abundant fruit crops, or have sentimental value. *Remember, however, that not all children resemble their parents; likewise, not all seedlings will have all the desirable traits of their parents trees.*

Choosing Seeds to Collect

The tree species or variety you choose to grow will depend on your personal preferences and on the types of trees that will grow well on your site. You should be careful in selecting the

trees from which you take seeds and in choosing the particular seeds to collect. Take seeds only from the tallest, straightest, healthiest, most fruitful trees. Be sure to look farther than your own property. Trees within a 200-mile radius of your site will generally tolerate the climate. Trees from natural populations 200 miles north of your site will be especially cold hardy. Trees from natural populations to the south may have faster growth rates. Seeds from trees that have been introduced into the area will probably grow well, but these trees do not have the long-selected, proven performance of trees from natural populations.

Ask permission if you wish to pick seeds from someone else's trees, and be careful not to damage parent trees as you collect the seeds. Check the seeds to be sure that they are sound and free of insects. Watch for telltale holes or spots on the seeds that could indicate insect damage. Cut open a few sample seeds. If insects are present inside, avoid the seeds from that tree.

When and How to Collect Seeds

Trees produce seeds in a variety of "packages". Cones, pods, berries, nuts, samaras, acorns, and capsules are all examples of different types of seed packages. You need not remove the seeds from their packages at the time you collect them; processing the seeds will be discussed later.

Collecting seeds at the right time is very important. Overripe and underripe seeds may not grow at all. Underripe seeds will not germinate, whereas overripe seeds may be rotten or may have been damaged by insects or weather. If you wait too long for seeds to ripen, animals or the wind may remove them before you have a chance to collect them.

The best time to collect seeds is when they just begin to ripen. Unfortunately, this time varies with individual trees, seasons, and locations. Approximate times are shown in Table 1, but rely on your own judgment. Here are some of the signs that indicate when seeds are ready for harvest:

* **Color and texture-** As seeds ripen, their package changes in color and texture. The seed cones, capsules, or pods usually turn from green to tan, brown, grey, or yellow. Ripe cones will be greenish but will have brown-edged scales. Fruits, such as apple (pome) or cherry (drupe), and berries take on their showy ripe colors: red, orange, yellow, purple or blue. Many seeds or seed packages also change in texture or density. Seed capsules, pods, and cones may lose moisture and weight and become dry and light. Fruits and berries become juicy and soft.

* **Animal activity** - Squirrels, birds, and other animals will begin cutting cones or picking fruit just as the seeds are ripening. Harvest seeds at once - there may be none left later.

* **Dropping, splitting, and opening** - When seeds are ripe, their packages may fall of the tree, split or crack open, or shoot out seeds. In the case of cones, the spaces between the scales that enclose the seeds will widen. Although it will be impossible to find many of the seeds that have dropped out of the packages, the fact that some seeds have dispersed is a good sign that those remaining in their packages are ripe and ready to harvest.

As a very general rule, tree seeds should be harvested on dry days between late August and late October. There are exceptions, however. Some trees produce seeds that ripen at other times of the year. Seeds of birch, cottonwood, elm, poplar, willow, and red and silver maple ripen in the spring. Serviceberries, mulberries, and cherries ripen in late spring or summer. Kentucky coffeetree beans should be harvested in late winter.

The method used to collect seeds depends on the type of seed package and tree. Often the biggest problem is reaching the seeds. Although seeds from young trees are easier to pick, seeds from fruitful, tall, older trees are better because these trees have proven themselves in growth and form. You may be able to reach the seeds (fruit) with a good ladder. Another way to gather seeds from tall trees is to spread a tarp or old sheet on the ground beneath the branches and then shake or flail the tree branches with a long pole to knock down the seeds. Cones can be gathered with a *"cone hook"* which consists of a 3/4-inch diameter metal hook on the end of a long bamboo pole. A cone hook can be made from a length of stiff wire, electrical tape, and a pole.

If these methods do not bring the seeds within reach, your only option is to wait for the seeds to come to you. Leaving a tarp or ground cloth spread out beneath the tree may make it easier to collect seeds that fall. Wind, water, gravity, or animals may assist you by concentrating seeds in pockets. Look for piles of wind-blown cottonwood, elm, or poplar seeds in the spring - in the city, you may be able to pick up thousands of seeds from curbs or gutters. If you are lucky, you may come upon a squirrel's seed cache. The many seeds that squirrels harvest are usually of good quality and have high germination rates. Of course, you will not be able to identify the particular trees from which the seeds have come. This will limit your ability to predict whether the trees that grow from the seeds will have the exceptional traits of the parent tree.

If possible, keep the seeds from every tree separate and label each collection. Record the species of tree from which the seeds were taken and the date and place you collected them. If you later want to gather more of the same seeds or to sell exceptionally fine seeds, this information will be essential.

How to Process Your Seeds

Specific directions for gathering, processing, and preparing seeds from more than 40 varieties of trees are given in Table 1.

The first step in preparing seeds is to remove the seed from its package. Some types of packages contain numerous seeds. The seeds must be separated from one another and from all of the packaging material.

Cones should be picked when the scales are tan but before they open and release the seeds. Spread the cones in pans and dry them in the sunshine for several days or at very low heat (about 110 degrees Fahrenheit) for several hours. This process will cause the scales to spread. You can then shake the thin, winged seeds out of the cones. The wings will come off with gentle rubbing or sifting of the seeds. The wings and other chaff can then be winnowed out (blown away) by a strong wind or by using a fan or hair dryer on a cool setting.

Individual berries and other fleshy fruits usually do not contain more than a few seeds. Pick the fruits when they look and smell ripe. If the flesh of the fruit gets moldy, it can rot the seed. If the flesh is soft, you can process the seeds right away, but if it is hard, it should be softened and fermented by placing the fruits in water at room temperature for two days. You can remove the soft pulp of fruits and berries by mashing the fruits, grinding them in a food mill, or rubbing them on wire screen or hardware cloth. Then carefully wash the pulp away with water and press the seeds through an appropriately-sized screen. The seeds should then be air dried, rubbed, and winnowed to remove any remaining pulp.

Nuts should be processed by removing the husks befor they dry and harden. You can loosen the husks with a mallet or by placing the nuts in a cloth bag and stomping or stepping on it.

Other pods and seed heads should be air dried for two or three days and then broken apart to release the seeds.

Seeds with little packaging, such as acorns, samaras (winged seeds), and the light seeds of cottonwood, elm, birch, poplar, and willow require no special handling. Spread them and air dry them for a day if they are damp.

After they have been processed and cleaned, seeds may be stored, planted, or prepared for planting. Although some seeds lose vitality with time, others store quite well. Seeds to be stored should generally be air dried for one day and then placed in airtight jars or plastic bags. Keep these containers in a refrigerator at a temperature between 33 and 36 degrees Fahrenheit.

How to Prepare Seeds for Planting

Although different seeds vary in their readiness for planting, most Illinois tree seeds that are shed in the fall are in a dormant state, much like that of a hibernating animal. Their dormancy prevents them from germinating in autumn or winter. In some seeds, dormancy is the result of a very thick, tough seed coat. This type of dormancy can be broken by abrading the seed coat with a metal file or coarse sandpaper.

More commonly, tree seeds are physiologically dormant and require cool temperatures to cue the chemical changes that will cause the seed to germinate and grow. The cue can be provided naturally by planting the seeds in the fall. The cold temperatures and the soil moisture will gradually release the seeds from dormancy, and they will germinate in the spring. Alternatively, the seeds can be "fooled" by a process called **stratification**. This technique artificially provides the cues that break dormancy. To stratify seeds, mix them with an equal volume of moist sand or vermiculite and store them loosely in plastic bags or flats at 33 to 41 degrees Fahrenheit for two to four months or until early spring. The seeds can then be sown outdoors and should germinate promptly. Do not allow the seeds to dry between stratification and planting. Spring-ripening seeds are generally not dormant and should be planted immediately.

How to Select and Prepare a Seedbed

The greatest problem for young trees is moisture. When the soil contains too little moisture, seeds will not germinate and seedlings will die. Too much moisture will encourage damping off, a common fungal disease that can kill young seedlings. Carefully choosing, preparing, and maintaining a seedbed will help prevent moisture problems.

Location, Shape, and Size - The seedbed should be in an open area, well away from the shade (and diseases and pests) of larger trees. Some protection from wind is important in very windy areas. If drouth is common in the spring and summer or if you will be growing trees that require a lot of moisture, the seedbed should be near a water supply. The area must be protected from animals, both rodents and livestock.

Seedbed size and shape depend on the number of trees you intend to plant. A bed that is 4 feet wide can be weeded easily (Figure 1.) A 12-square-foot bed can be used to grow 500 conifers but fewer broadleaf seedlings. Only 100 black walnut seedlings, for example, could be grown in that area.

Soil Texture - A major factor affecting moisture and thus the likelihood of damping off is the texture of the soil. A sandy loam or loamy sand soil will have good drainage and will allow for rapid root growth. A porous, well-drained soil is also less likely to exhibit frost heaving in winter. If your soil is heavy or waterlogged, the addition of weed-free organic matter and sand will help.

Soil pH - The acidity of alkalinity of the soil also affects the chance that damping off will occur. Unfortunately, the pH range that is favorable for most deciduous broadleaf species (plus arborvitae and juniper), 6.0 to 8.0, also promotes the growth of fungi. Pines, firs, spruces, and evergreen broadleaf species, such as holly, tolerate more acidic soils (pH from 5.0-5.5) that are less conducive to damping off. Adding peat will lower the pH and improve the soil texture.

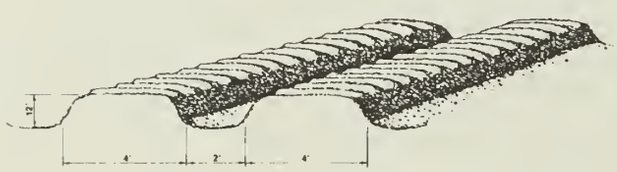


Figure 1. Raised seedling beds may be formed by pulverizing soil removed from the pathways and spreading it on top of the bed area.

Fertility - Work fetilizer into the soil as the bed is being prepared. If soil fertility is low, the ideal choice would be to add 1-2 bushels of weed-free compost per 40 square feet. This material releases nutrients slowly and improves the structure of the soil. For slow-growing trees in naturally rich soils, you may not need to add fertilizer in the first year. For poor soils, apply an additional top dressing of 1/4 pound of 10-10-10 fertilizer per 40 square feet. Apply half in early May and half in mid-July.

Soil amendments should be added as the bed is worked (spaded) to a depth of 12 inches. Remove rocks and trash. Soil from a 2-foot-wide path area along the sides of the bed should be pulverized and added to the bed to increase the bed's elevation (Figure 1). A raised bed provides improved air circulation and drainage and is easier to cover with snow fencing or hardware cloth if shade or protection from rodents becomes necessary.

How to Plant Your Seeds

Seeds may be broadcast or planted in rows 6 inches apart for conifers and 8-12 inches apart for broadleaf species. Plant the seeds at a depth equal to two or three times the seed's diameter. If you plant in the fall, cover the seedbed with a mulch of weed-free straw or sawdust to reduce sudden changes in soil temperature. The mulch and the seeds or nuts can be protected over winter from weather and animals with a layer of hardware cloth. Remove the mulch early in the spring.

The number of seeds to sow depends on the type of seed, its size, its germination rate, the growth rate of the seedlings, and their size when they will be transplanted. Roughly 2 to 3 teaspoons of spruce or pine seed (0.13-0.40 ounces) is sufficient for a 12-square-foot area, whereas about 220 walnuts could be sown in the same area.

How to Care for Your Seedlings

After removing the hardware cloth and mulch in early spring, keep the seedbed moist until the seeds begin to germinate. To help prevent damping off, water the trees sparingly after germination. Despite this precaution, fungicides may be needed to control the disease. Follow the label instructions on the fungicide container.

Seedlings of some species, especially trees native to woodland babitats, may require shade when they are small. You can partially shade them by suspending a segment of snow fence several inches above them. The slats of the fence should run north and south so the seedlings will be exposed to alternating sun and shade as the sun moves from east to west. Remove the fence during periods of humid, foggy, and overcast weather when damping off is especially likely.

Water the seedlings sparingly during the first growing season. Pull weeds as soon as they appear; pulling them after they have grown large will disrupt the root systems of the tree seedlings. Large weeds should be clipped. Beginning in the late summer, thin the seedlings by selecting and very carefully pulling out the weakest plants. By the following spring you should be left with only stout, vigorous seedlings at the recommended density. Mulch the seedlings in the fall.

Seedlings can be lifted and moved to a permanent planting site or a transplant bed in the spring after one to three years in the seedbed. The seedlings should be large enough to survive transplanting but not so old that their roots are deeply meshed in the seedbed. You can gauge the amount of root growth when you thin the seedlings in the first year. Choose and prepare the planting site carefully, and do not allow the seedling roots to dry even slightly during transplanting.

EDITOR'S NOTE: ***Table 1*** *can be found at the end of the newsletter. It lists the procedures for gathering, processing, storing, and planting Illinois tree seeds.*

Adapted and Reprinted from: Hooper, C.A. and T.W. Curtin. ***Growing Illinois Trees From Seed.*** Circular 1219. University of Illinois Cooperative Extension Service, 1983.

WOOD 'N NICKELS

Research on Taxol extractives from Pacific Yew

Anticancer Drug Taxol

Availability of the anticancer drug taxol may be increased as a result of work started last week at the USDA Forest Service-Forest Products Laboratory (FPL) in Madison, Wisconsin. FPL scientists received a Pacific yew log from the Umpqua National Forest in Oregon to begin research aimed at extracting taxol from the wood as well as the bark of Pacific yew.

Taxol has shown promise as a treatment for ovarian cancer, and may also be useful in treating breast, lung, and colon cancer. Currently, taxol is derived from Pacific yew bark, which comprises less than 1/8-inch of the outer layer of the tree. the extremely small quantity available from each tree limits the amount available for clinical trials.

FPL chemical engineer Raj Atalla and chemist John Obst will explore better ways of extracting taxol from the tree's heartwood. The taxol concentration in the heartwood appears to be less than that in the bark, but a Pacific yew contains 50 to 100 times more heartwood than bark.

"Pacific yew may contain a minimum of ten times and as much as 100 times more taxol than is currently obtained from a tree", Atalla said. *"FPL researchers are likely to achieve this improved yield because of their knowledge of wood chemistry and fiber structure"*, he said.

Initial studies will verify the taxol concentrations in the heartwood. Tests will be performed on narrow slices from the 8-inch diameter, 180 year old log. This information will serve as the baseline for assessing the effectiveness of various extraction technologies.

Atalla and Obst propose to examine three extraction technologies. The first will reduce the size of the wood particle used with conventional extraction methods, which may improve yield. The second method will attempt to improve the solubility of the taxol molecule by adding various chemical couplers. The third method will improve access to the taxol molecule by swelling the wood fiber to make it more porous.

The first year of this research program will cost $450,000. The research at FPL contributes to a larger Forest Service effort to protect Pacific yew populations while supporting taxol production and testing. In June, Secretary of Agriculture Edward Madigan signed a cooperative agreement with Bristol-Myers Squibb Company to increase the production of taxol from the bark of Pacific yew trees harvested from National Forest System lands. The agreement permits collection of Pacific yew bark while protecting forest ecosystems and the long-term viability of the species.

Current inventories estimate a population of 23 million yew scattered across 11.5 million acres of National Forest land in western Oregon and Washington, and 6.5 million yew on 2.1 million acres of Bureau of Land Management land in the Pacific Northwest.

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Source: Extend - Wood Products Technology Transfer, Volume 4, October 1991.

Wood Treated With Herbicides - Is It Safe For Firewood?

How safe is firewood cut from hardwood trees treated with herbicides?

This question was asked recently by a homeowner who wanted to burn wood in a fireplace that had been cut from a tree which was treated with a common forest herbicide, but was unsure if it was safe to burn inside the home.

We suspect this may be a common occurance on many properties and offer this summary of a study which addresses this concern. The research report and abstract entitled *"Suitability of Hardwoods Treated with Phenoxy and Pyridine Herbicides for Use as Firewood"* by P. B. Bush, D.G. Neary, C.K. McMahon and J.W. Taylor, Jr. appeared in Archives of Environmental Contamination and Toxicology, Volume 16, 333-341 (1987).

EDITOR'S NOTE: The herbicide names used in the following abstract are the common names used in the agriculture and forestry industries. Trade names for the herbicides listed below are as follows: **2,4-D** - Dacamine, Weedone, Esteron; **dicamba** - Dicamba, Banvel, Trooper; **dichloroprop** - Weedone 2,4-DP, Weedone 170, Weedone CB, Super Brush Killer, Super Brush Killer 32, Envert 171; **picloram** - Tordon; **triclopyr** - Garlon.

ABSTRACT. "Potential exposure to pesticide residues resulting from burning wood treated with phenoxy and pyridine herbicides was assessed. Wood samples from trees treated with 2,4-D [2,4-dichlorophenoxy] acetic acid, dicamba [3,6-dichloro-*o* -anisic acid], dichlorprop [2-(2,4-dichlorphenoxy) propionic acid], picloram [4-amino-3,5,6-trichloropicolinic acid], and triclopyr [(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid contained variable amounts of parent compound residues at 4, 8, and 12 months after application. At the time of the latter sampling, residues of 2,4-D, dicamba, and picloram were <2.1 mg/kg on a fresh weight basis. Mean residue concentrations of triclopyr and dichlorprop were somewhat higher at 3.5 and 13.0 mg/kg, respectively. In a laboratory experiment, samples with known amounts of herbicide residue were subjected to either slow or rapidly burning conditions in a tube furnace. During slow combustion, relatively stable compounds such as 2,4-D, dicamba, and dichlorprop were released in significant amounts. Rapid combustion greatly enhanced decomposition of 2,4-D, dicamba, dichlorprop, picloram, and triclopyr. A well-developed fire in a wood stove or fireplace, with active flaming combustion, where temperatures commonly reach 800-1000 degree Centigrade, should result in greater than 95 percent thermal decomposition of the herbicides examined in this study. Burning of herbicide-treated wood under smoldering conditions could result in very low levels of herbicide residue in ambient indoor air. However, the exposure levels are less than 0.3 percent of the threshold limit value for 2,4-D and triclopyr. The exposure is also more than 3 orders of magnitude lower than the established acceptable daily intakes for these products."

EDITOR'S NOTE: Chemical manufacturer representatives indicate there should be no problem burning firewood treated with these herbicides in a fireplace or woodstove provided a vigorous-buring fire is maintained.

TRACKS features related articles on small game and non-game management for woodland owners. If you have particular questions you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

Ringneck Pheasant

(Phasianus colchicus)

Ringneck pheasants, native to Asia, were brought to Europe about the 10th century and were abundant in Greece nearly 1000 years ago.

The first successful establishment of pheasants in the United States was the Chinese ringneck in the Willamette Valley in Oregon in 1881. The birds multiplied rapidly from this planting and 50,000 were reported killed the first day of an open season in 1892. As a result of this experience, pheasants have been propagated and released until they have become established in almost every suitable location in the United States and Canada.

Description

Cock pheasants are large, gaudy birds weighing from 2 1/2 to 3 pounds that measure up to 30 inches, including tails 18 to 20 inches long. The combination of large size, bluish-green head, red cheek patch, and usually white neck ring make it impossible to mistake a cock ringneck pheasant for any other Illinois bird. Ault male pheasants wear reddish-brown feathers that fade out to a bluish-green on the lower back and copper or maroon feathers on the breast. Feathers on the base of the wing are reddish-brown, but toward the end of the wing, they are a lighter brown. The adult hen is smaller than the cock, weighing about two pounds. Feathers on the female are generally tan with brown and cream markings.

Distribution and Abundance

Pheasants are found in parts of the northern states from the East Coast west into Montana and the province of Saskatchewan and south into the Oklahoma panhandle. They thrive in parts of Oregon, Washington, California, Idaho, and Utah. The first recorded release of pheasants in Illinois was made near Macomb in 1890 by Dr. W.O. Blaisdell.

The Illinois Game Commission (now the Department of Conservation) first released pheasants in 1906. Pheasants have been released in every county of the state but have established self-maintained populations in northern, east-central and southeast Illinois. Peak pheasant numbers in Illinois were reached in the early 1960's. Land use changes since then have resulted in a sharp decline in numbers in the original range.

Habitat

Pheasants are birds of open country. They like farming country with small woodlots, brushy fencerows, ditches, and swales. Pheasants are associated with cropland, especially where corn, soybeans, and small grain are grown. In fact, within its range, the better the agricultural land, the better the conditions for the pheasant. A favorable land use pattern for pheasants consists of: (1) 65 to 80 percent of the farm in cultivated crops such as corn, soybeans and wheat; (2) 15 to 30 percent in hay and rotation pastures; (3) 5 to 10 percent in brush and woods; and (4) 3 percent or more of the total area in brushy fence rows, odd areas, and permanently protected herbaceous cover.

The birds need cover for roosting, crowing, nesting, feeding, loafing, and escape. They are most numerous where all cover requirements are close together. Cattail swamps, clumps of willow, weed patches, and dense brushy fencerows are preferred winter protection cover. Pheasants prefer to nest in hayfield types, either tame hay or native prairie vegetation. Some nesting also occurs in small grain fields. Roadsides of alfalfa-brome have been substituted successfully as farmers' hayfields turn to row crops. Early mowing of hayfields interferes seriously with successful nesting.

Habits

Pheasants have short, rounded wings that are good for short bursts of speed, but not for long flights. Therefore, they will alternately beat their wings and then glide with their wings held rigid on long flights. As ground-loving birds, they often avoid trouble by running. Pheasants tend to move into heavier cover and form flocks in winter. Sometimes flocks

are segregated by sex and many people think that the flocks composed primarily of hens indicate that the cock population has been over-hunted. Pheasants generally tend to reach their peak weight in January, maintaining it until spring, and lose weight during the breeding season.

Generally the daily range does not exceed one-half mile. The seasonal range does not usually exceed one mile. Food and cover must be within the daily range. In the winter, pheasants seldom go more than one-fourth of a mile from the cover that they are using to find food.

Foods

More than half of the diet of pheasants chicks is insects for the first few months of their lives. Mature pheasants eat insects in summer and fall, but not in the amounts eaten by the chicks.

Corn is the most important single food item for pheasants in Illinois. Studies indicate that mature birds will eat 1 1/2 pounds of corn per week. Pheasants eat small grains; wild fruits and berries are not important. They also eat garden fruits and vegetables. Ragweed seed is the most important wild seed in the pheasant's diet. Smartweed, foxtail, pigweed and jewelweed seeds are significant items. Pheasants eat the green leaves of dandelions, clover, blue grass, dock, and other wild plants, probably to obtain vitamins. Early morning and late evening are favored feeding times.

Reproduction

In spring, cock pheasants establish and defend territories, "crow" to attract hens and intimidate rival cocks, and try to fight off interlopers. Fights between the males are violent, but they are seldom fatal. The size of the flock of hens, or harem, per cock may vary from 1 to 22 hens, although harems average from 5 to 7 hens in Illinois. Some cocks, called "rogue" cocks, do not establish territories or maintain harems. There is little or no interchange of hens among harems, once the harem has been firmly established. The cock pheasant will strut, partially spread his tail, and fluff out his feathers to impress hens. They always display toward a hen. Since the males are polygamous, most of them are surplus and are not needed for successful reproduction. Harvest by hunting roosters only does not affect the spring breeding population in Illinois.

Hens build their nests on the ground in grass, alfalfa, unmowed roadsides and other low vegetation. A few hens will begin nesting prior to mid-April, but the peak of nest establishment occurs during May.

Hens lay a clutch of about 11 eggs in a period of two weeks. The hen will desert the nest if she is disturbed early in the nesting cycle, but after she has incubated the eggs for several days, she is reluctant to leave. Many hens abandon their first nest voluntarily for unknown reasons. In years when farming activities are delayed until mid-May by adverse spring weather, some early nests and hens may be destroyed by plowing and/or discing operations. Mowing of hay, roadsides and waterways will destroy about 20 percent of the nests each year. Pheasant eggs hatch in 22 to 23 days and about 9 out of 10 eggs produce chicks. In normal agricultural years, peak hatching occurs in late June and early July. Hens that have not succeeded in bringing off broods will continue to try into August or September. Delay of mowing until August 1 or later will assure safe pheasant nesting.

The hen and her family leave the nest as soon as the chicks have dried off and can walk. A chick will weigh less than an ounce when it is hatched; in 14 weeks after hatching, hens will weigh about 2 pounds and cocks over 2 1/2 pounds. Chicks can fly in short hops when they are 10 days old, but prefer to avoid danger by running and hiding. In 40 days, they have replaced their "down" feathers with juvenile plumage. Sexes can be distinguished 8 weeks after they have hatched when the cock becomes larger than the hen and shows a crimson tinge in the cheek. In 16 to 17 weeks, pheasants are in their "adult" plumage.

It takes about 3 1/2 to 4 months for a hen to establish a nest,

lay and incubate the eggs, and raise the chicks. Generally, the hen "weans" chicks 9 to 10 weeks after hatching. A hen will raise only 1 brood a year. Nearly 1 out of 3 chicks dies before it is 16 weeks old. About as many cocks are hatched as hens, but a "cocks-only" hunting season changes the percentages in favor of the hens.

Mortality Facts

Ground squirrels, skunks, opossums, house cats, free running dogs, snakes, foxes, and other predators will eat pheasant eggs and chicks. The two worst in Illinois are skunks and farm pets. Predation is not an important controlling factor of pheasant abundance. Automobiles probably kill more pheasants than predators. Pheasants are hosts to lice, tapeworms, threadworms, and other external and internal parasites, but ordinarily parasities have no severe ill effect on pheasant populations. In Illinois, 8 to 9 pheasant chicks out of 10 and 4 to 6 adults out of 10 alive in spring will be dead before the following spring. The fall hunting season takes advantage of game populations at their highest peak for the year and utilizes surplus birds that would disappear before the winter is over, hunted or not.

Management

In the prime Illinois pheasant range, fertile soils, intensive cultivation, cash grain farming, and high pheasant populations go hand in hand. The most important reason why there are not more pheasants in Illinois is because they lack undisturbed nesting cover. Farmers can increase pheasant populations on their land by following a few simple steps:

*** Delay mowing of grassy roadsides and hay field edges until August.**

*** Sow odd areas, ditch banks, and waterways to brome, orchard grass, or timothy and delay mowing these areas until August.**

*** Plant rows of shrubs next to crop fields and leave brushy areas and marshlands for winter cover.**

*** Use chisel plowing in fall rather than moldboard plowing, or leave one-fourth of the cornfield unplowed until spring.**

In east-central Illinois, the Department of Conservation's Roadside Seeding Program is available to farmers and road districts to provide needed pheasant nest cover.

Importance

Known as one of the world's great game birds, the pheasant has adapted to the Illinois farm scene as well as any native game bird. Peak numbers of pheasant abundance in years past saw an average of 228,000 hunters harvesting 793,000 cock pheasants over the period 1956-1969.

Pheasant hunting demand in Illinois exceeds the supply by as much as 40 percent. Severe habitat losses will probably continue to keep the supply at a low level.

Source: Reprinted from "**Ringneck Pheasant" - Illinois Wildlife Factsheet,** Illinois Department of Conservation - Division of Wildlife Resources, 1981; and **More Wildlife for Recreation,** "Land Management for Ringnecked Pheasant", USDA Soil Conservation Service, 1972.

Selected Illustrations by Kent Olson; In: **Increasing Wildlife On Farms and Ranches.** Great Plains Agricultural Council Wildlife Resources Committee and Cooperative Extension Service, Kansas State University - Manhattan; April 1988 and by Ned Smith; In: **Woodlands and Wildlife,** Hassinger, J., et al. The Pennsylvania State University, University Park, PA, 1979.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Arborvitae *August–September*	Remove seeds from ripe, closed cones by heating to 110° F. in oven for 4 hours. Shake out seed from open cones. Remove scales and empty seed by winnowing (sifting in a strong wind or in airstream from fan or cool hair dryer).	Store in closed container at 32° to 38° F.	Sow in fall.	Sow ¼ to ⅜ inch deep. Half shade seedlings. Thin to 50 seedlings per square foot.
Ash **black** *July–September* **blue** *July–October* **red** *September–October* **white** *October–November*	Dry samaras at room temperature. Separate clusters. Winnow off any trash.	Store dry seed in closed containers at 41° F.	Sow in fall immediately after harvest before end of October.	Sow ¼ to ¾ inch deep. Mulch seed bed, but remove mulch when germination starts. Thin to 10 seedlings per square foot. Transplant after 1 year in seedbed.
Aspen, bigtooth *May–June*	Pick straw-colored catkins from trees and dry on pans at room temperature for 1 to 3 days. Capsules will open. Remove cotton by rubbing seed through 20- and 40-mesh screens.	Keep very dry in airtight vials at 36° to 41° F.	Sow in spring after harvest. Seeds are nondormant.	Soak seedbed; it must be saturated when seeds are sown. Keep moist continuously for the first month. Sprinkle seed on soil surface. Do not press in or cover. Protect from wind and from rain splash. Soak or mist bed to avoid dislodging seeds.
Beech *After first frost*	Shake nuts from trees after frost opens the burs.	Store dry nuts in sealed containers at 41° F.	Sow in fall and protect from squirrels or stratify[2] for 3 months and sow in spring.	Cover nuts with ½ inch of soil. Give seedlings half shade until late summer of first year. Thin to 25 seedlings per square foot in second year.
Birch **river** *May–June* **paper** *August–September*	Pick slightly green catkins (strobiles) before they fall and shatter. Place in bags immediately to prevent seed loss. Dry in pans at room temperature for several weeks.	Store very dry seed at room temperature.	Sow in late summer or fall, or stratify[2] and sow in spring.	Broadcast seed and cover with a very light layer of soil (1/16 to 3/16 inch). Shade lightly early in the first summer. Thin to 30 seedlings per square foot. Transplant after 2 years.
Buckeye *September–October*	Collect buckeyes when capsules split open. Dry at room temperature for a day and remove any remaining capsule parts.	Store in plastic bags at 34° F.	Sow in fall or store over winter and plant in early spring.	Cover with ½ inch of soil. Do not overwater seedbed. Transplant after one year.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Butternut *September–October*	See **Walnut.**			
Catalpa *After October*	Collect "lady cigars" (pods) when brown and dry. Air dry and break apart to obtain flat, long, tattered seed.	Store dry in closed containers in cold location.	No special treatment required. Sow in spring.	Sow ⅛ inch deep. Transplant after 1 year.
Cherry **choke** *July–October* **black** *August–September*	Collect purple or black fruit. Macerate and float off or screen out pulp by rubbing over a screen or using a food mill. Seed may be sown wet or air dried for a few hours.	Air dry and store in plastic bags at 33° to 41° F.	Sow in fall and protect from rodents or stratify[2] in moist peat or vermiculite at 37° to 41° F. for 4 months.	Sow ½ inch deep. Fall-sown seeds need 3 inches of straw for mulch. Stratified seed should be sown as early in spring as soil can be worked. Transplant after 1 year.
Cottonwood *May–June*	See **Aspen.**			
Crabapple *September–October*	Harvest yellowish green apples. Remove pulp as for **cherry.**	Store very dry in airtight containers at 36° to 50° F.	Sow in late fall.	Sow ½ to 1 inch deep in loose soil. If soil is crusty, apply a thin sawdust mulch. Use fungicide to control powdery mildew.
Dogwood *September*	Choose seed from trees in a grove rather than a solitary tree. Fruit pulp need not be removed.	To store, remove pulp as for **cherry.** Air dry stones and keep in airtight containers at 38° to 41° F.	Sow fruits in fall directly after harvest.	Sow ¼ to ½ inch deep. Mulch with sawdust.
Elm **American** *March–June* **slippery** *April–June*	Sweep up seeds when they fall. Air dry for 2 to 3 days.	Store very dry seeds in sealed containers at 25° F.	Sow in spring just after harvest. Many seeds will not germinate until the following spring.	Sow seed ½ to ¾ inch deep. Keep bed moist until seeds germinate. Transplant after 1 year.
Hackberry *September–October*	Pick fruit after leaves drop in fall. Removal of pulp is not necessary but may increase germination rate. To remove, see instructions for **cherry.**	Store dried fruits in airtight containers at 41° F.	Sow in fall or stratify[2] in moist sand at 41° F. for 2 to 3 months and sow in spring.	Sow ½ inch deep. Protect seed from birds until germination.
Hickory **bitternut** *September–October* **shagbark** *September–October* **mockernut** *September–October*	Collect nuts as they fall. Remove husks by hand or by trampling.	Store nuts in plastic bags at 41° F.	Sow in fall and mulch heavily or stratify[2] for 3 months and plant in spring.	Plant nuts ¾ to 1½ inches deep, six to eight nuts per foot. Protect from rodents.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Holly *October*	Remove pulp as for **cherry.** Dry seeds if they are to be stored.	Store dry seed at 33° to 40° F. in closed containers.	Sow in fall immediately after collection. Seed will not germinate for 2 to 3 years.	Cover seed with ⅛ to ½ inch of soil. Mulch well. Propagation by cuttings is faster.
Horsechestnut *September–October*	See **Buckeye.**			
Juniper *November*	Pick mature, waxy blue berries in the late fall. Soak for 1 day in a weak lye solution. Rinse thoroughly on screens and remove pulp as for **cherry.** Air dry for a day and winnow off trash.	Store dry in airtight containers at 20° to 40° F.	Sow in fall.	Cover with ¼ inch of firmed soil or sand. Mulch. Keep seedbed moist. Remove mulch when seeds germinate. Shade seedlings with snow fencing. Transplant after 1 to 2 years.
Kentucky Coffee Tree *After October*	Pick pods from tree or ground. Remove seeds from pods by hand.	Dry seed and store at 33° to 41° F. in closed containers.	File through outer seedcoats or soak seeds in water for 24 hours and in vinegar for 4 hours. Rinse thoroughly.	Sow in spring 1 inch deep, 12 to 18 seeds per foot in rows 6 inches apart. Transplant after 1 year.
Larch *September*	Pick cones as soon as they ripen (turn brown). Place in pans and heat for 8 hours at 120° F. to open cones. Shake out seeds. Rub seeds or place them in a grain sack and tread on them to remove wings. Winnow off trash and wings.	Store dry seed in airtight containers at 10° to 22° F.	Sow in fall.	Cover with ¼ inch of soil. Cover beds with burlap or mulch, which should be removed before germination in spring. Thin to 25 seedlings per square foot. Transplant after 2 years.
Locust **black** *September–October* **honey** *October*	Pick pods when they are ripe but before they open. Air dry. Flail pods in a bag or run through a grain separator to remove seeds from pods. Remove chaff and empty seeds by winnowing or floating off in water.	Store dry seed in closed containers at 32° to 40° F.	Same as for **Kentucky coffee tree.** Plant in March to May. Seeds should be treated with an inoculant to hasten nodulation (N_2 fixation).	Black locust seeds should be covered with ¼ inch of soil or sand. Sow 20 to 30 seeds per foot in rows 6 to 8 inches apart. Plant honeylocust seeds twice as deep at half the density. Transplant after 1 year.
Maple **Norway** *October–November* **red** *April–July* **silver** *April–June* **sugar** *October–December*	Air dry samaras (winged seeds). It is not necessary to remove wings.	Store seed in sealed containers at 35° to 41° F.	Sow red and silver maple in late spring. Sow other maples in fall in well-mulched beds.	Sow ¼ to 1 inch deep. Protect seedbeds from mice and birds. Thin seedlings to 25 per square foot. Shade seedlings, but watch for damping off. Transplant after 2 years.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Mountain-Ash *August*	Pick ripe fruits before the birds do. Macerate fruit from seeds as for cherry. Dry and winnow off trash.	Store dry seed in airtight containers at 34° to 38° F.	Sow in fall or early winter.	Cover with 1/16 inch of soil. Protect seedlings from deer and rabbits. Transplant after 1 year.
Mulberry *June–August*	Spread ripe fruits on a clean surface and allow to soften for 4 to 5 days at room temperature. Rub through a no. 16 screen and float off pulp. Air dry seeds and winnow off any remaining trash.	Dry seed may be stored in a freezer.	Soak seeds in cold water for 4 days and sow in fall or stratify[2] in moist sand at 33° to 41° F. for 1 to 3 months and sow in spring.	Barely cover seeds. Plant in rows 8 to 12 inches apart, 50 seeds per foot. Cover with mulch until germination, then half shade for 2 weeks.
Oak *August–December*	Cull out bad acorns by floating them out. Sound nuts will sink. Remove any nuts that are moldy or have holes.	Storage is not advised.	Sow immediately. White oaks will germinate in fall, red oaks in spring.	Plant ¼ to 1 inch deep in rows 8 to 12 inches apart. Firm soil. Mulch and cover with hardware cloth to discourage rodents. Thin to 10 to 35 seedlings per square foot. Transplant after 1 year.
Olive *September–December*	Air-dried fruits or clean stones may be used. To clean stones, see instructions for **cherry.**	Store dry in airtight containers at 34° to 50° F.	Sow in fall. Where mice are a problem, use clean stones rather than dry fruits.	Sow ½ to 1 inch deep. Mulch seedlings to prevent mud splash. Thin to 12 to 30 seedlings per square foot. Transplant after 1 to 2 years.
Osage Orange *October*	Gather hedge apples when they drop. Store them outdoors in a pile over winter. Fruits will ferment and can be macerated easily in spring. Clean as for **cherry.**	Air dry seeds and store in airtight containers at 41° F.	Sow in spring.	Plant ¼ to ½ inch deep in rows 8 to 12 inches apart.
Pawpaw *August–September*	Pick fruits when they first soften (before opossums get them). Macerate in water and float off pulp or sow entire fruit.	Unknown.	Sow in fall.	Plant seed ¾ inch deep. Germination is slow and poor.
Pecan *September–October*	See **Hickory.**			
Persimmon *September–November*	Pick soft, ripe fruit from tree or ground. Macerate to remove seed (see instructions for **cherry**). Air dry for 2 days.	Store dry seed in airtight containers at 41° F.	Sow in fall.	Plant seed 2 inches deep. Mulch. Transplant in late summer of first year.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Pine **white** *August–September* **Scotch** *September–October*	Harvest tawny yellow or tan but unopened cones. Open and dry cones on trays in the oven at 120° F. for 12 hours. Clean seeds as for **larch.**	Store dry seed at 0° to 5° F.	Soak seeds in water for 2 days. Place in moist sand or a plastic bag at 33° to 41° F. for 2 months. Sow in spring.	Press seeds firmly into soil. Cover with ¼ inch of sand. Thin to 40 seedlings per square foot. Watch for fungal diseases. Transplant after 2 years.
Plum *June–October*	Collect soft fruit. Clean as for **cherry.**	See instructions for **cherry.**	See instructions for **cherry.**	Sow 1 to 2 inches deep. See instructions for **cherry.**
Poplar *May–June*	See **Aspen.**			
Redbud *August–September*	Air dry pods and remove seeds as for **locust.**	Air dry seeds; store in closed containers at 35° to 41° F.	Cover a volume of seeds with four times that volume of water. Let seeds stand overnight. Sow seeds immediately, while still moist, in fall.	Firm ¼ inch of soil over seeds.
Sassafras *August–September*	Harvest dark blue fruits. Remove pulp as for **cherry.** Air dry seeds.	Store in airtight containers at 35° to 41° F.	Sow very late in fall.	Firm ½ inch of soil over seeds. Mulch seedbed and cover with bird or shade screening until after last spring frost.
Serviceberry *June–August*	Pick ripe fruit promptly or birds will get it. Remove pulp as for **cherry.**	Store dry seed in airtight containers at 41° F.	Sow in fall.	Plant 25 seeds per foot of row and cover with ¼ inch of soil. Keep bed mulched until germination starts.
Spruce *September*	Seeds may be ripe before cones are brown. Harvest cones promptly. Place in pans in oven at 110° F. for 10 hours or air dry for several weeks to remove seeds. Clean as for **pine.**	Store dry seed at 33° to 38° F.	Mix seeds with moist sand and let them sit at 34° to 41° F. for 8 hours. Sow in spring.	Plant ¼ inch deep. Mulch with sawdust or pine needles. Thin to 40 seedlings per square foot. Transplant after 2 years.
Sweetgum *September–November*	Pick yellow-green seed heads before all seeds drop out. Air dry heads on pans for 5 to 10 days until seeds drop out. Shake and winnow as for **arborvitae.**	Store dry seed in sealed bags at 35° to 40° F.	Mix seeds with wet sand and store at 30° F. for 30 days. Sow in spring after last frost.	Sow seeds on soil surface and press into soil with roller. Mulch with ¼ inch of sand. Thin to 20 to 25 seedlings per square foot.
Sycamore *November*	Harvest greenish brown heads. Air dry. Crush heads. Rub seeds through hardware cloth and winnow off hair.	Store in cool, well-ventilated area in open mesh bags.	No special treatment is required. Sow in spring.	Cover seeds with ¼ inch of soil or mulch. Keep seedbed moist until germination. Thin to 10 seedlings per square foot.

Table 1. Procedures for Gathering, Processing, Storing, and Planting Illinois Tree Seeds

Tree *Approximate seed collection dates in italics*	Gathering and processing	Storing	Pretreatment method or time to sow	Planting and seedling care
Tulip Tree *August–September*	Pick tan cones or shake seeds out of cones onto a cloth on a dry day. Dry cones for 7 to 20 days and break apart to release seeds (samaras).	Store in plastic bags at 36° to 40° F.	Sow in fall.	Cover seeds with ¼ inch of soil. Thin to 25 to 30 seedlings per square foot.
Walnut **black** *October–November* **white** *September–October*	Collect nuts from the ground. Remove husks when they are firm but slightly soft. Follow procedure for **hickory.**	See instructions for **hickory.**	Sow in fall.	Cover with 1 to 2 inches of soil and 1 inch of sawdust mulch. Plant 15 seeds per foot. Cover mulch with screen to protect from rodents. Thin to 5 seedlings per sq. ft. Transplant after 1 year.
Willow *April–May*	Pick capsules as they turn from green to yellow. Watch closely! Sow capsules immediately.	Does not store well.	Sow immediately after harvest.	Broadcast seed, then press into soil with a roller. Soil must be kept moist until seedlings are well established.
Witch Hazel *August–September*	Pick closed fruits in early autumn before they split and discharge seeds. Ripe fruits are dull orange. Air dry fruits in pans for several days. Screen out seeds.	Store dry seed in airtight containers at 41° F.	Sow in early October.	Sow in rows 8 to 12 inches apart. Mulch over winter but remove mulch in spring.

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ILLINOIS TIMBER PRICES

ILLINOIS DEPARTMENT OF CONSERVATION
life and land together

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361

December 5, 1991

PRICES PAID ILLINOIS TIMBER PRODUCERS MAY 1991 THROUGH AUGUST 1991

PRICE REPORTING ZONES

Summer sawtimber prices paid Illinois timber growers were generally lower than a year earlier for both stumpage and FOB. Of the timber buyers reporting volume of their 1991 operations, 41% indicated their volume was 500 thousand board feet or higher. This is down from the 1990 percentage of 48%.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is gratefully appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit, Zone 2 the Claypan Unit and Zone 3 the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a guide for determining the market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price received. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE SAWTIMBER PRICES IN $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

SPECIES	May 1990-August 1990		November 1990-February 1991		May 1991-August 1991	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ash	148	286	129	245	114	223
Basswood	72	139	61	165	69	196
Beech	47	122	47	120	49	139
Cottonwood	43	122	40	113	40	116
Sweet Gum	48	128	49	125	43	118
Elm & Hackberry	52	130	47	123	45	121
Hickory	56	136	46	131	47	133
Soft Maple	58	139	53	137	53	139
Sugar Maple	71	160	57	136	58	153
Black Oak	103	170	92	174	83	150
Pin Oak	53	130	51	125	55	126
Red Oak	167	289	153	276	130	247
White Oak	167	282	163	271	143	261
Yellow Poplar	95	202	72	179	70	175
Sycamore	48	127	43	120	43	121
Black Walnut	307	508	302	531	319	569
Woods Run Bottomland	63	136	59	135	65	132
Woods Run Upland	112	169	94	177	95	180

FACE VENEER PRICES $ PER M BD. FT.

Red Oak	426	737	371	629	458	663
White Oak	853	1,351	744	1,400	898	1,317
Walnut	1,171	1,886	1,709	1,890	1,200	1,817

UNPEELED PULPWOOD PRICES, $ PER TON, SELECTED PERIODS

	May 1990-August 1990		November 1990-February 1991		May 1991-August 1991	
	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
Ton	1.59	13.00	1.90	13.00	1.75	--,

COOPERAGE PRICES, $ PER M BD. FT., STUMPAGE AND F.O.B. SELECTED PERIODS

	Stumpage	F.O.B.	Stumpage	F.O.B.	Stumpage	F.O.B.
White Oak	194	401	178	330	217	343

-OVER-

Timber Prices
May 1991-August 1991
December 5, 1991

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
May 1991 - August 1991

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber				Dollars			
Ash	M bd. ft.	50 - 200	100 - 400	50 - 200	120 - 500	50 - 150	100 - 320
Basswood	M bd. ft.	50	140 - 150	40 - 100	120 - 300	30 - 130	130 - 350
Beech	M bd. ft.	30 - 50	80 - 140	50 - 80	100 - 300	--	--
Cottonwood	M bd. ft.	30 - 50	80 - 140	20 - 60	100 - 130	20 - 50	130
Sweet Gum	M bd. ft.	25 - 50	80 - 140	20 - 60	100 - 130	45	--
Elm & Hackberry	M bd. ft.	25 - 50	80 - 140	20 - 60	100 - 140	20 - 100	--
Hickory	M bd. ft.	30 - 100	80 - 175	20 - 80	100 - 200	20 - 60	120 - 130
Soft Maple	M bd. ft.	40 - 100	120 - 150	30 - 80	100 - 160	40 - 100	100 - 200
Sugar Maple	M bd. ft.	40 - 75	120 - 195	30 - 100	100 - 220	50 - 100	100 - 250
Black Oak	M bd. ft.	30 - 200	115 - 250	50 - 100	120 - 200	30 - 120	100
Pin Oak	M bd. ft.	30 - 55	115 - 140	15 - 80	100 - 160	15 - 100	100 - 135
Red Oak	M bd. ft.	50 - 220	115 - 500	60 - 200	120 - 450	50 - 200	100 - 380
White Oak	M bd. ft.	50 - 300	125 - 350	60 - 200	120 - 600	75 - 300	100 - 400
Yellow Poplar	M bd. ft.	40 - 100	80 - 250	40 - 100	140 - 200	30 - 65	--
Sycamore	M bd. ft.	25 - 50	80 - 140	20 - 80	100 - 150	20 - 60	140
Black Walnut	M bd. ft.	250 - 500	250 - 700	100 - 500	250 -1000	85 - 500	320 -1000
Woods Run Bottomland	M bd. ft.	40 - 150	100 - 160	35 - 150	120 - 160	30 - 130	--
Woods Run Upland	M bd. ft.	55 - 150	110 - 250	35 - 150	120 - 250	80 - 175	--

		STATEWIDE	
		Stumpage	F.O.B.
2. Face Veneer			
Red Oak	M bd. ft.	200 -1,110	250 -1,250
White Oak	M bd. ft.	200 -1,500	500 -2,000
Walnut	M bd. ft.	200 -3,000	850 -3,500
3. Pulpwood			
Unpeeled	Ton	1.00 - 2.00	--
4. Cooperage			
White Oak	M bd. ft.	100 - 300	200 - 420

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	96
Scribner	1
International	3

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	24	100 - 200
Zone 2	48	80 - 200
Zone 3	28	140 - 200
ILLINOIS	25	80 - 200

VOLUME OF 1991 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1- 100	48	21	35	33
100- 500	14	28	35	26
500- 1000	5	24	11	15
1,000- 3,000	24	10	8	13
3,000 +	9	17	11	13

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - MAY 1991 - AUGUST 1991

	STATEWIDE STUMPAGE*
Woods Run Upland	$102 - $389/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Gerald L. Clampet
State Statistician

Jay Wells, Garry D. Kepley,
Agricultural Statisticians

"Printed by authority of the State of Illinois," 12/5/91, 1,800, 1,499

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Illinois Forest Management

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

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Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features timely tips to help you manage your woodland more effectively. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave., Urbana, IL 61801.

The following article appeared in the July, 1992 issue of **Missouri Conservationist.** *It is reprinted with permission and has been edited to reflect Illinois forest resource data.*

The Carbon Connection

by Bruce Palmer

The rise of atmospheric greenhouse gasses and global warming are regarded as two of the biggest environmental concerns of the 1990s.

These two issues are usually linked, although there is still debate about whether the temperature of the planet is gradually warming.

However, the rise in atmospheric trace gasses such as carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons has been widely documented. The atmospheric concentration of carbon dioxide (CO_2)

is now about 350 parts per million (ppm). From a study of carbon in tree rings and gas bubbles in polar ice, it is estimated that the concentration of CO2 in the mid-1800s, was 270 ppm. there has been a rise of about 75 ppm over the past 150 years due to extensive land clearing, intensification of agricultural, and the burning of fossil fuels.

Atmospheric carbon is estimated to be increasing worldwide by about 1.9 billion tons annually in an environment where between 4.8 and 5.8 billion tons of carbon are released each year. About 80 percent of the net increase is from burning fossil fuels.

The United States, with its energy-intensive society, contributes about 22 percent of the total. The remainder may be from terrestrial ecosystems and land use changes, such as tropical deforestation.

It is believed forests contain 90 percent of the carbon in land plants, and oceans absorb between 26 and 44 percent of the CO2. With most scientists predicting atmospheric CO2 to double by the mid-21st century, this poses several questions about the future interaction of increased CO2 and our forests.

Most of the rise in CO2 is from burning fossil fuels, particularly in the United States. There are many social, political and economic obstacles to reducing our use of fossil fuels. But biological concerns over the increase in CO2 and any corresponding rise in global temperatures are finally receiving the attention they merit.

Biological results could include the change or migration of land plants, and the related change in wildlife, rainfall patterns and disturbances such as fire. Forests play a major role in the debate over rising levels of CO2, both in how their growth will be affected, and what impact forests might have mitigating the effects of higher amounts of CO2 in the atmosphere.

Does CO2 Help Trees?

Carbon compounds are the basic building blocks, the energy sources and the chemical regulators of all plants. Carbon dioxide is used in photosynthesis to make carbohydrates, the food for the plant.

Inadequate CO2 is often a limiting factor for plants. Experiments show that when the CO2 content of air is raised, plants are able to use the extra CO2 and, as a result, they grow faster. Commercial greenhouse growers use this knowledge to their advantage. By raising the concentration of CO2 in the greenhouse, the growth of vegetables can be increased.

Researchers have found the same response in tree seedlings. When grown under elevated CO2 conditions, tree seedlings grow faster, have more roots and larger leaves. However, experiments have been relatively short-term and with young trees under greenhouse conditions.

Besides the obvious physical limitations of placing a mature tree under controlled conditions, time constraints hamper germinating a tree seed in increased CO2 and observing the responses over the tree's lifetime. So, at this time we are not quite sure what the long-term effect of increased CO2 will be on the health of our forests.

> ***" Each gallon of gasoline a car burns pumps about five pounds of carbon into the atmosphere."*** **World Watch, March-April 1992**

Do Trees Reduce CO2?

Forests accumulate carbon in their branches, stems, and in the leaf litter on the ground. Approximately 45 percent of total dry weight of a tree's biomass is carbon. An oak-hickory forest typically stores 16 pounds of carbon per cubic foot of merchantable wood.

Forests act as carbon storage areas, or carbon sinks. Old forests that experience little growth hold carbon, but sequester little additional atmospheric carbon. Declining forests that are losing biomass due to mortality and decay become sources of carbon.

Because young, fast-growing trees store the greatest amount of carbon over their lifetime, establishing forest plantations as carbon sinks to offset the annual increase in atmospheric CO2 has been suggested. Several scientists have explored the economics of storing carbon in forest plantations.

One report estimated that a tree planting and management program limited to marginal farm land and forest

land could achieve a 1.4 billion ton (56 percent) decrease in the United States' carbon emissions. This program involved tree planting on marginal farm land and active management of currently forested areas. The projected cost of this program would be about $19.5 billion per year.

A formula has also been developed to estimate the carbon storage of a community's urban forest. It also provides an estimate of the number of trees necessary for an individual or corporation to plant to compensate for their carbon production.

Using a per capita carbon emission rate of 2.3 tons per year, a newborn baby needs 45 seedlings to store all the carbon he/she would produce during his/her lifetime. The sooner one gets started, the fewer trees are required. For example, a 40-year old needs to plant and care for 210 trees and a 50-year old needs 550 trees.

> ***Last year was the second warmest ever, after 1990. Eight of the past twelve years have been the warmest on record."***
> **Goddard Institute for Space Studies, in World Watch, March-April 1992**

One scientist reported that to store the annual carbon increase of 2.9 billion tons would require 1.148 billion acres of tree plantations at a cost of $372 billion. This is about 75 percent of the non-forested land in the United States, or 1.5 times the currently forested area. This project did not take into account the loss of farm land for forest plantations.

Obviously a tree planting program to reforest over a billion acres is not a practical solution to the increase in carbon emissions. Even though additional forest land would provide many wildlife, recreational and water quality benefits, the extreme cost makes it unacceptable. The billions of dollars needed could be much better used finding a way to reduce our reliance on fossil fuels or curb their emissions.

There are practical applications of these suggestions that may help us buy some time until a more permanent solution is found to the increasing amount of CO2 in the atmosphere. These include a combination of active forest management and tree planting for energy conservation.

To use Illinois as an example, the state has 4.26 million acres of forest land. The volume of merchantable wood is about 2.2 billion cubic feet with a net annual statewide growth of 54.6 million cubic feet. Using the factor of 16 pounds of carbon per cubic foot of wood, Illinois' forests currently contain about 17.6 million tons of carbon and are adding about 437,000 tons to that total each year.

If every acre of forest land in Illinois could be placed under active management, this growth rate could be increased 3.3 times. Proper harvesting methods, planting of some areas and thinning of overcrowded stands would increase forest growth to 180 million cubic feet per year, storing 1.45 million tons of carbon.

Although managing every acre of forest land is not possible, the example shows the potential in this state to increase carbon storage. Re-growth of mature stands is also important in storing additional carbon.

Young, fast growing trees fix more carbon than a mature tree. A mature tree which is harvested and processed into wood products stores the carbon in its wood until it decays or is burned. A tree left to die and decay in the forest releases hundreds of pounds of carbon back into the atmosphere.

Energy conservation measures can also help reduce fossil fuel emissions. Tree planting for windbreaks has been used for many years. Windbreaks around homes and farmsteads can reduce heating costs up to 40 percent.

Livestock which are sheltered by windbreaks make better weight gains than those not sheltered. Trees help prevent soil erosion, which can lower the amount of fertilizer and petroleum used. Trees can also affect snow drifts to reduce snow plowing.

Urban residents can reduce energy requirements with trees, too. Planting as few as three well-placed trees around a house can reduce annual cooling needs by 30 percent. Trees can also reduce winter heating costs by as much as 22 percent. Properly located and managed trees can reduce energy needs in office buildings.

Healthy Forests Help Us All

At the current rate of annual CO2 emissions, most scientists agree that the concentration of atmospheric

CO_2 will double by the mid-21st century.

Forests do have the potential too influence the level of CO_2 in the atmosphere. Forests store great quantities of carbon in the wood of trees as well as the leaf litter and organic soil. Although establishing tree plantations for the sole purpose of sequestering carbon is not feasible, wise use of forests could help reduce CO_2 build-up until a more permanent solution is found.

Active management of forests to maintain healthy, growing trees and the use of trees for energy conservation are two of the most practical ways forests can be used to reduce atmospheric CO_2.

Bruce Palmer is a forestry information specialist with the Conservation Department.

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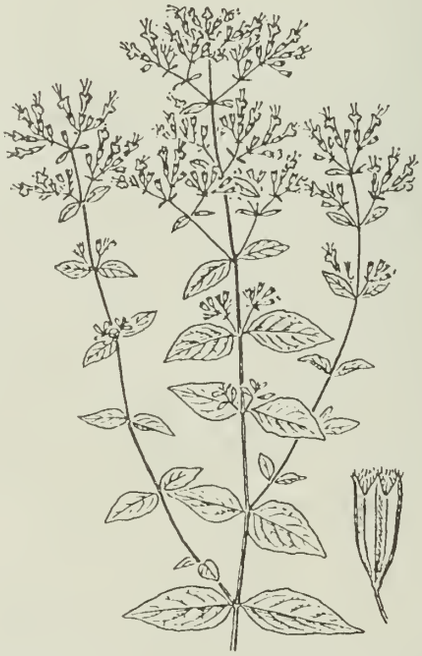
An Ecosystem Management Question: What's Happening To The Wild Flowers In Our Oak-Hickory Forests?

Much of the forest land in the central hardwood region is covered by oak-hickory forests, which have gone through periodic fire, harvesting, and grazing. Now that these forests are relatively free of disturbance, we are seeing significant invasion of sugar maple seedlings on the more moist sites. As older oak trees are harvested or die, maple saplings quickly take over the site, leading to a maple forest type.

Conversion of oak-hickory forests to maple forests has also led to a significant decrease in the type and abundance of wild flowers and other forest forbs. These plants are important constituents of the oak-hickory ecosystem, but most have been little studied by foresters.

Research has shown that sugar maple can interfere with the growth of other plants through both competition (removing the essential resources from the environment) and "allelopathy" (the release of chemicals that can alter growth of adjacent plants). However, we have little evidence to say what role, if any, do allelochemicals produced by sugar maple and other shade producing shrubs play in the decline of wild flower populations.

Scientists from North Central's Carbondale Laboratory and Southern Illinois University are trying to determine if sugar maple and several other common understory shrubs produce sufficient allelochemicals to alter the growth and flowering behavior of dittany *(Cunila origanoides*(L). Britton).



Why does dittany drop out as sugar maple moves in?

This seldom studied, but common perennial forb of the mint family produces small, light purple flowers in late summer. It is found in most upland oak-hickory forests and rapidly declines when a middle-level canopy of sugar maple is present.

To mimic the natural ecosystem as nearly as possible, researchers tested the sensitivity of dittany in the greenhouse to allelochemicals produced by hardwood

seedlings. Would sugar maple, flowering dogwood, pawpaw, or white oak seedlings produce sufficient allelochemicals to reduce growth of dittany plants?

Soil leachates (water that has soaked through the soil around the roots) were recycled twice a week between the donors, sugar maples, and the targets, dittany). The foliage of the donor and target plants was periodically sprayed with water to collect allelochemicals produced by leaf and stem tissues. Dead leaves were added for litter. When the dittany plants were dug up, a ball of soil was kept around each plant to make sure any microorganisms that might destroy allelochemicals were present.

The scientists found that none of the hardwood seedlings altered the height, stem dry weight, or date of first flowers on the dittany plants. Leachates from white oak did reduce the total number of flowers produced compared to the number of flowers on dittany plants exposed to pawpaw and flowering dogwood leachates. The response to sugar maple leachates was intermediate even though these leachates had the highest chemical content at the end of the growing season.

The first-year's research indicates that the absence of dittany under a sugar maple canopy probably results from competition—most likely for light—and not from allelopathy. The experiment is being repeated to confirm first-year results. Field studies are also being planned to evaluate the relationship between increasing shade and production of allelochemicals by hardwoods.

As with most ecological studies scientists are finding that simple solutions do not exist and that interdisciplinary teams will be needed to address the complex interactions we face under ecosystem management.

(If you would like more information about this study, contact: Jerry Van Sambeek at the Forestry Sciences Laboratory, Southern Illinois University, Carbondale, Illinois 62901; tel (618) 453-2318; FAX (618) 453-2911).

Source: ***North Central NEWS***, February, 1993. North Central Forest Experiment Station, USFS, St. Paul, MN

SilvaScene

SILVASCENE features articles related to the art and science of growing trees. This information is presented to better acquaint you with the species that grow in your woodland and how you might manipulate your woodland to favor their growth.

White Ash

White ash *(Fraxinus americana)* is the most common and useful native ash, but is never a dominant species in the forest. It is an upland species with native range *(Figure 1)* that includes every county in Illinois. Large trees commonly associated with white ash in Illinois forests include northern red oak, white oak, sugar maple, red maple, black cherry, American basswood, American elm, and yellow-poplar; smaller understory trees include pawpaw, American hornbeam, flowering dogwood, and eastern hophornbeam.

Soils and Topography

White ash has demanding soil fertility and soil moisture requirements. It grows most commonly on fertile soils

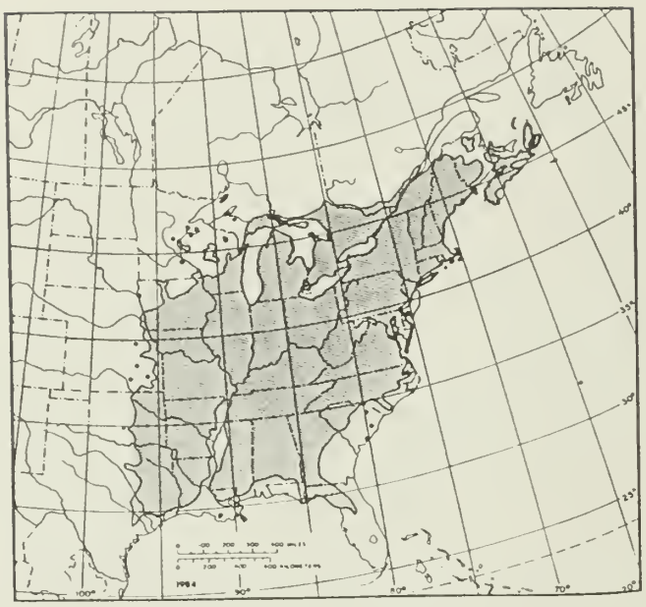


Figure 1. The Native Range of White Ash.

with a high nitrogen content and a moderate to high calcium content, and its pH tolerance varies from 5.0 to 7.5. Soil moisture is an important factor affecting local distribution. Best growth occurs on moderately well drained soils, including areas underlain by compacted glacial till; light textured, well drained, glacial drift; and sandy to clay loam soils in which roots can penetrate to a depth of 16 inches or more. While it can be found in various topographic situations throughout its native range, in the Central States it is common on slopes along major streams and various upland situations, and rarely found in the flat bottoms of major streams or in depressions. However, it is intermediately tolerant of temporary flooding.

Life History

White ash produces male and female flowers on separate trees (dioecious), and they appear with or just before the leaves in April and May. Female flowers remain receptive for about 1 week after they appear. Pollen from male flowers can be carried by the wind from ash trees up to 328 feet (100 meters) away. Good seed crops normally are produced about every three years. About half of the flowering trees will produce abundant seed crops. Generally, white ash is 8 to 10 inches d.b.h. (diameter breast height) before it flowers abundantly, but can flower on vigorous trees as small as 3 to 4 inches d.b.h.

The minimum seed-bearing age is 20 years. Seedfall occurs from September to December. The fruit is a winged samara that can be carried by the wind up to 460 feet (140 meters). The seed exhibits strong dormancy and must undergo 2 to 3 months of moist stratification before it will germinate. Laboratory germination tests indicate approximately half of the seeds produced will be viable and will germinate the following spring if the soil or freshly disturbed litter layer is moist. During the growing season, height growth is completed in the first sixty days, while diameter growth generally continues until August. Stumps of freshly cut seedlings and sapling white ash sprout readily. Usually only one or two stems are produced.

White ash is a pioneer species that will establish itself on fertile abandoned fields and is considered an intermediate to intolerant species. Seedlings prefer partial to full sunlight for good growth, but will survive in fairly dense shade for 8 to 10 years. As white ash increases in age, it becomes less tolerant of shade and must receive adequate sunlight in order to grow into the overstory. On good sites, white ash grows faster than white oak and hickory, but slower than yellow-poplar. Following an improvement cut or harvest cut where openings left in the canopy are at least three-fourths the height of the overstory trees, white ash seedlings with an established root system can grow 10 to 20 feet in 10 years. Throughout its range white ash is a minor but constant component of both the understory and overstory of mature forests on suitable soils. It owes its position in the final overstory to its ability to persist for a few years in moderately dense shade and to respond quickly to openings in the canopy created by death or other causes. A dominant and codominant white ash tree responds readily to thinning and within a few years will increase its crown area to take full advantage of any reasonable release. Little or no epicormic branching (sucker-like sprouts that grow from suppressed buds in the bark) occurs on the boles of released trees. White ash is considered to be a rapid self-pruner with most shade-killed branches dropping in 1 to 5 years.

Mature white ash trees can reach 80 to 100 feet in height on good sites in Illinois. When a tree becomes financially mature is dictated by the landowner's financial situation and the rate of return he or she is willing to accept. Based on a 4 percent rate of return, white ash trees growing on an average to good site in Illinois reach economic maturity as sawtimber when their diameters reach 16-22 inches. These figures are approximate

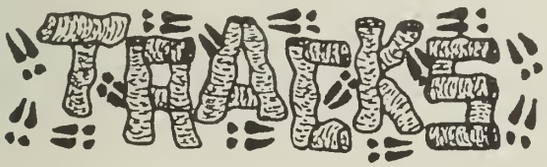
guides and allow for variation in site quality.

Damaging Agents

The most serious disease affecting white ash is ash decline or dieback. Various other diseases associated with it include ash yellows, anthracnose, leaf spots, nectria canker, and heartwood rots.

Of the insect pests known to damage white ash, oyster-shell scale is the most important. Severe infestations cause yellowing of the leaves, and if prolonged, may kill some trees. The forest tent caterpillar, ash borer, and leaf rollers are also contributing pests to forest trees.

Sources: USDA-Forest Service. ***Silvics of North America - Hardwoods***. Agriculture Handbook 654, Volume 2. 1990; and ***Recommended Sliviculture and Management Practices for Illinois Hardwood Forest Types.*** Illinois Technical Forestry Association. 1972.



TRACKS features related articles on small game and non-game management for woodland owners. If you have particular questions you would like addressed, please write the newsletter editor. We will incorporate them into TRACKS as space permits.

River Otter

(Lutra canadensis)

The river otter belongs to a group of mammals known as the carnivores (Order Carnivora) or flesh eaters. Most of the members of this order are known as predators because they kill and eat other animals. The teeth of carnivores are especially well adapted for securing and feeding on flesh. The canine teeth are large and pointed; they serve to seize and hold prey. As a further adaptation to this meat-feeding habit, specialized flesh-cutting teeth, the carnassials, are usually developed from the fourth upper premolar and first lower molar teeth. As a whole, the group exhibits a fairly high level of intelligence.

Other animals in the Order Carnivora are foxes, weasels, skunks, the mink, badger, and coyote. The river otter is further segregated within the order and placed in the family Mustelidae which includes weasels, skunks, martens, and the mink. The common name has two sources "river" denotes the habitat of the animal, while "otter" comes from the Anglo-Saxon words oter or otor.

Description

The river otter is a large, elongated mammal about the size of a fox but built like a weasel. Its head is broad and flattened with a conspicuous nosepad, prominent whiskers, moderately sized eyes, and small ears. The solidly built body is almost cylindrical with a stout neck and long, heavy tail which is flat on the bottom, thick at the base, and tapers from the body toward the tip. The legs are short and have five fully webbed toes on each foot. The weight of the body is supported on the toes. Except for the pads on the toes and soles, the undersurfaces of the feet are furred. The body fur is a rich brown color, lighter on the underparts. The dense, oily underfur is overlain by glossy guard hairs that are usually straight but in some individuals may be curly. Total length ranges from 900 to 1,350 mm (35.5 to 53 in); weight varies from 4.5 to 11.4 kg (10 to 25 lb). Males are larger than females.

Distribution and Abundance

The river otter was once fairly common along the large streams in Illinois, but apparently by the early 1800's it was scarce in most parts of the state. Since 1900 it has been seen or taken in approximately 25 counties.

Today otters are still rare but some live along the upper Mississippi River particularly from Rock Island north to the Wisconsin border. An occasional otter report from a different area, usually from along the Illinois River or lower Mississippi, is also received.

Habitat

River otter habitat consists of streams, rivers, and lakes, which are frequently but not always bordered with timber. Water of good quality appears to be essential. The home is a burrow in a bank, under the roots of large trees, beneath rocky ledges, under fallen trees, or even in tickets of vegetation. These burrows are rarely built by the otter but represent former homes of muskrats, beavers, or woodchucks. Dens on the water's edge have an opening above water in summer, but in winter this is closed and the only entrance is below water. The nest chamber may have a bare floor or a slight accumulation of leaves and grass.

Habits

River otters are usually nocturnal but may occasionally be observed during the day. They are active all year and are not inhibited by changes in temperature or weather. Otters have a large annual home range which may include between 80 and 160 km (50 and 100 mi) of shoreline. However, during any single season a family may confine its activities to only a small section of stream totaling 4.8 to 16 km (3 to 10 mi). While tending to follow water courses, otters sometimes cut across land between two parts of a stream or from one body of water to another. Occasionally these crossings are used so often they become trails.

Otters are graceful and powerful swimmers. They may swim with just the head and shoulders showing above the surface, or completely under water, or in an undulating pattern alternately going above and below the surface. Otters can swim 0.4 km (0.25 mi) under open water or ice and can remain submerged for 3 to 4 minutes. On the surface they can swim at least 9.6 km (6 mi) per hour.

Along the shore, otters have regular landing places. Upon emerging from the water, they dry and dress their coats by shaking briskly and sometimes by rolling in the grass, leaves, or snow. Sometimes they also take dust baths or wallow in mud. In addition to the scent posts where they leave their droppings, latrines are made about 1 m (3.3 ft) from the den entrance. Their large, coarse droppings contain fish scales, crayfish skeletal parts, and other indigestible foods.

Otters commonly travel on land with a loping gait, but on snow or ice they alternate this with a series of slides. After a few steps forward, they slide on their bellies for 3 to 6 m (10 to 20 ft.) while holding all their feet backward. By running and sliding they can traverse 24 to 29 km (15 to 18 mi.) in an hour.

One outstanding trait of otters is their apparent zest for sliding down steep slopes. These slides may be on clay banks made slippery by their wet bodies or on slopes covered by snow or ice. The slide may terminate in a snow drift or a deep pool of water. Sliding is probably indulged in as a social sport. In contrast to their relatives, the weasel and the mink, which are mostly solitary, otters generally live together all year in family groups and are extremely sociable animals.

Foods

The river otter feeds mainly on animal foods. It catches and kills most of its food but occasionally carrion is consumed. Fish and crayfish are favorite items but sometimes frogs, salamanders, snails, clams, snakes, turtles, muskrats, birds, or earthworms are added to the diet. Captive animals do not fare well on an exclusive diet of fish.

Otters usually eat the head of their prey first. In the case of fish they discard the tail fin. After eating, an otter cleans its face and whiskers by rubbing them on grass or snow.

Reproduction

The river otter's breeding habits are not well known. Most of the available information is based upon observations of a few captive animals. The gestation period is uncertain; estimates vary from 9 to 12 months with a period of dormancy for the embryos, similar to the pattern of reproduction in the weasel and the mink. In captivity, females do not appear pregnant externally until about a month before the young are born. The single litter is generally born from January to May and usually contains from 2 to 4 young with extremes of 1 to 5. Adults remate immediately following birth of the young.

The young are born over a period of 3 to 8 hours after which the female curls tightly around them in a "doughnut" shape and may put her head over the "hole" above them. They can thus nurse unmolested and be protected from the outside air. At birth, the cubs, or kits, are blind, toothless, and dark brown. The eyes open around 35 days of age but the kits do not come out of the den much before they are 10 to 12 weeks old. Weaning occurs about 4 months after birth.

The male may assist in caring for the young after they leave the nest, but the female takes the major share of this responsibility. Captive but free-roaming otters do not introduce their young to water until they are about 14 weeks old, and then the young have to be coaxed to swim. Before the young swim by themselves, the adults often carry them on their backs in the water. The kits stay with their parents during the first winter but disperse in the spring. Otters are capable of breeding at one year of age, but many fail to breed before they are two.

Management

Predation by man and the declining productivity of streams have brought about the reduction of otters in Illinois. Improvement of stream conditions, especially water quality, is the recommended management measure. The population of otters in Illinois is too low to permit any harvest and they have been protected by a continuous closed season since 1929. The river otter is presently classified as a "threatened" species in Illinois.

Importance

Otter fur is one of the most beautiful as well as durable of North American furs; consequently, otter pelts command a high price. The hunting of otters with dogs was formerly considered great sport, but because of the present low population, is not practiced today. While the fishing habits of otters do not endear them to fishermen, it must be realized that otters eat rough as well as game fish and take many other kinds of foods besides fish. In addition, since otters require a considerable range, the density in any given stretch of water is low. Therefore the otter's harvest of fish could not cause a serious drain on any stream in good condition.

Source: ***Illinois Wildlife Factsheet***. Illinois Department of Conservation, Division of Wildlife Resources.

Bugs 'n Blights

Trunk Decays

Trunk decays are major causes of low quality wood—wood with little or no economic value. As a forest practitioner you should be able to recognize trees at high risk for decay and remove them if timber production is your primary objective. Remember, however, that decayed trees often develop into den trees or nesting sites and provide essential habitat for wildlife.

Wounds and dead branches and roots start the processes that can lead to trunk decays. Even though decay is a natural process, much can be done to prevent, assess, regulate, predict, and detect trunk decays in trees that re not overmature. Start by preventing wounds, pruning properly and detecting and assessing internal defects accurately.

Preventing Wounds

You should try to prevent wounds by minimizing logging and fire damage, keeping increment borers out of trees, and developing and managing recreation sites carefully. When you construct roads and trails or manage wildlife and grazing areas, avoid injuring trunks and roots as much as possible.

Prune Properly

Remove living, dying, and dead branches in such a way that the "collar" at the branch base is not injured or removed. The collars should not be removed to make a cut flush with the trunk or joining stem. Flush cuts are major causes of serious defects: discolored wood,

decayed wood, wetwood, resin-soaked wood in conifers, shakes and radial cracks, cankers, and areas of weakened wood above and below the wound that may be easily infested by insects. Also, do not leave stubs! Do not paint the cuts!

How Trees Resist the Spread of Pathogens

Unlike animals, which restore injured and infected cells through a process called healing, trees can only "compartmentalize" infected wood by forming new wood cells in new spatial positions. The tree survival system depends upon forming protective boundaries to resist the spread of pathogens. The boundaries also defend the liquid transport, energy storage, and mechanical support systems of the tree. The boundaries are made up of protective chemicals, and in some cases after wounding, the cell arrangements are altered to form protective boundaries.

The root and butt injuries on this black walnut have ruined the most valuable part of the trunk. Logging wounds must be reduced.

Which Defective or Decayed Trees Should You Remove?

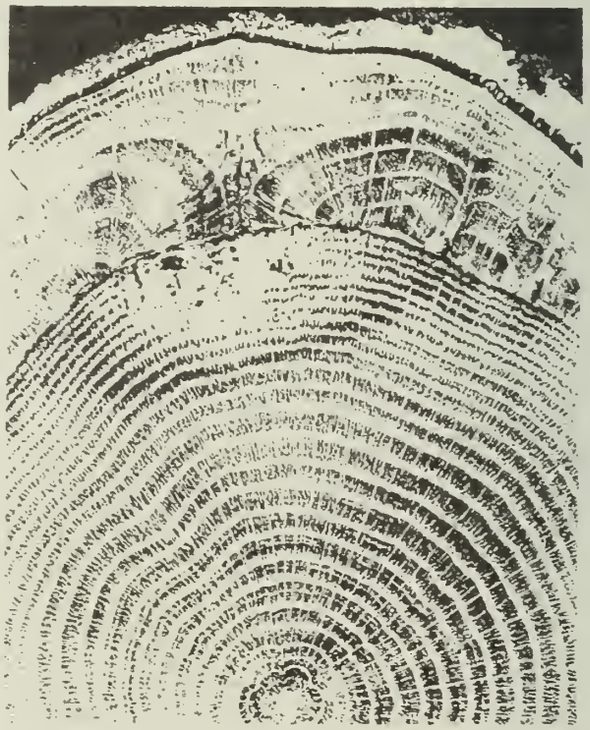
Here are some general guidelines for detecting and assessing decays and other internal defects in trunks:

1. Wounds at groundline and below living branches are associated with less defect than wounds at 1 to 3 meters above ground.

2. Wounds that are deep or wide, or both, are associated with more defect than wounds that are shallow, or long in a vertical plane.

3. Wounds directly above or below other wounds or old branch stubs are associated with more defect than wounds elsewhere on the trunk.

4. Wounds with hard, bleached surfaces are associated with less defect than wounds with dark, soft surfaces.



The 9-year-old wound in this northern red oak was well compartmentalized. The decayed wood was surrounded by a protective boundary of discolored wood. The wood that formed after the wound was inflicted was not infected by the wood-inhabiting pathogens.

5. Wounds inflicted during leaf formation and leaf shedding will lead to more defects than similar type wounds inflicted at other times.

6. Wounds inflicted in the spring during the onset of growth will have larger callus "ribs" than

wounds inflicted at other times. But, callus formation is not associated with development of decay. When callus formation is too rapid, the callus ribs turn inward and form a "ram's horn." When this occurs, the wound never closes, creating conditions perfect for wood-inhabiting pathogens.

The wound on this northern red oak not only led to a large column of decayed wood, but the callus turned inward and caused the wood to crack in vertical planes. When such vertical cracks break outward to the bark, frost will be blamed. Frost does not start "frost cracks," wounds do.

7. Wounds treated with wound dressing often form large callus ribs that turn inward to form "ram's horns." There are not data to show that wound dressings stop decay.

8. Wounds oozing fluids indicate internal wetwood, a disease caused by bacteria. Wetwood is difficult to dry for products.

9. Wounds with fungi fruiting bodies—conks or sporophores—are associated with advanced decay. When many conks are present the entire trunk will be decayed. Conks on wounds from 1 to 4 meters above ground are associated with large columns of decay. Conks at groundline indicate decay in roots and in the trunk to at least 2 meters height. Conks on a swollen butt indicate decay to at least 3 meters height. Conks on a swollen butt with cracks indicate decay, wetwood, and cracks to at least 4 meters height. Conks near large hollows indicate decay and wetwood to at least 5 meters height. Removing conks will not stop or stall decay. Be alert for conks or sporophores that grow for only a short time on the wound surface. Often the dried remains of the sporophores will be on the wound surface or on the ground near the tree base.

10. Wounds on roots indicate decay in the base of the trunk. Be alert for the fresh or old mushrooms of the shoestring root rot or "honey" mushroom. Other indicators are wet spots or water-soaked areas at the tree base. Basal decay may spread to 2 meters above ground on old trees.

11. Wounds with vertical cracks above and below them indicate internal decay and rink shakes. Ring shakes are circumferential cracks or separations.

12. Vertical cracks on the trunk indicate ring shakes, star shake, heartshake, and wetwood. Trees with many internal cracks cannot be used for valuable wood products.

13. Sapsucker (birds) wounds cause streaks of discolored wood and ring shakes.

14. Cankers with hard, bleached surfaces indicate very little defect above and below. Cankers with sunken surfaces and margins indicate long columns of advanced decay. Such cankers are called canker rots. To check for canker rots, cut into the surface of the canker. If compact fungus material is present, the defect is a canker rot. Often old conks from the canker can be found on the ground. Canker rots may also be centered about old branch stubs. The stubs may be swollen to form a round structure, or the canker may be long vertically to form a spindle-like canker. Trees with canker rots should be cut as soon as possible.

15. Broken tops or trunk leaders leave a stem stub. Decay associated with stem stubs will develop downward, and the diameter of the column of decayed wood will be the diameter of the stem when it died.

16. Trees with many decayed branch stubs will have many internal columns of discolored and decayed wood. Wetwood and ring shakes may also be associated with old branch stubs. Stubs between the 2 and 4 meter portion of the trunk are associated with the

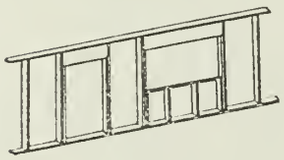
largest columns of defect.

17. Basal cracks or collar cracks indicate root and butt decay that may spread to 2 meters or more above ground. Trees with many basal cracks should be cut as soon as possible.

18. Old fire wounds are often associated with swollen butts, internal cracks, and advanced decay to 3 or more meters above ground.

19. Increment borer wounds are associated with long streaks of discolored and decayed wood.

Source: Shigo, Alex. ***Central Hardwood Notes.*** USDA- Forest Service. North Central Forest Experiment Station, St. Paul, MN. 1989.



CUTTING UP

The Causes of Wood Deterioration

Wood deterioration is the degrading or damaging of wood by outside agents, making the wood unsuitable for its intended use. The major causes of wood deterioration are fungi, insects, marine borers, and chemicals. Deterioration may occur prior to, during, and after the manufacture of lumber, as well as after the wood is in use. Therefore, deterioration is as much a problem for the lumber manufacturer as it is for the user or consumer. This article examines the problems of wood deterioration by fungi and methods of control and prevention.

Wood is commonly attacked by lower forms of plant life known as fungi. Unlike green plants, fungi are unable to make their own food; they feed on organic material stored in wood cells or on the wood substance itself. Three main types of fungi inhabit wood: wood-destroying or decay fungi, wood-staining fungi, and molds.

Wood-destroying fungi are probably the most important single cause of wood deterioration. They are capable of disintegrating the wood cell wall, thus changing the physical and chemical properties of the wood. This destruction of the wood substance is called decay or rot.

Wood-staining fungi, however, feed on the organic material stored in the wood cells. Their activity has little effect on wood properties. However, their presence in large concentrations and their dark color imparts a discoloration to the wood known as stain. Blue stain is probably the most prevalent degrade caused by wood-staining fungi. The staining or discoloration has a degrading effect on wood for certain applications since it detracts from the overall appearance of the material.

True molds similar to the type that grow on damp bread can also develop on wood, producing a fluffy, cotton-like growth. Unlike staining fungi, molds are usually superficial growths that can be easily brushed or dressed off the wood. Their discoloration is usually shallow and has little effect on wood properties.

All fungi have four basic requirements for survival and growth: food, air (oxygen), favorable temperature, water (moisture). By excluding or limiting any one of these, fungal growth can be prevented or restricted.

The food required by decay fungi comes mainly from the wood substance (cell walls)—a complex combination of cellulose, hemicellulose, and lignin, these materials are not directly usable by fungi as food. However, by secreting certain chemical substances called enzymes, fungi can break down these complex chemicals into simple nutritive compounds that they can use.

Based on their preference for certain cell wall chemicals and the resulting color change of the wood, decay fungi can be divided into two groups. White rot fungi attack all three major cell wall chemicals, but many species of white rots prefer or start with the lignin. Wood decayed by white rot is soft and has a whitish or bleached appearance. Brown rot fungi attack the cellulose and hemicellulose, leaving the wood with a brown, crumbly appearance. Stain fungi and mold, on the other hand, do not attack the cell wall, but feed on the starch and sugars stored in the wood cells.

For optimum fungal growth, wood must be at a moisture content above the fiber saturation point, about 30

percent. Below this moisture content, fungal activity is greatly reduced; below 20 percent moisture content, it is completely stopped. Consequently, sound wood that has been dried to below 20 percent will not decay unless it is subjected to wetting or dampness sufficient to raise its moisture content above the minimum required for fungal activity.

Furthermore, if wood which has decay already established is then dried to below 20 percent, the decay growth will be stopped. However, some species of fungi can remain dormant in dry wood for years and then reactivate and grow if sufficient moisture is supplied to the wood. This alternate wetting and drying can result in intermittent decay activity progressing, growing during the wet periods and becoming dormant during the dry periods.

The term dry rot is an unfortunate misnomer because it implies that wood can decay without being wet, which it cannot. The notion of rot in dry wood most likely comes from the appearance of wood that is severely decayed by brown rot. The wood looks unusually dry, brown, and cracked. However, while the fungi were actively growing in the wood, they required the level of moisture described previously. Another use of the term dry rot applies to the water-conducting species of decay fungi. These fungi attack "dry" wood by their ability to transport moisture to the wood from some source of supply such as the soil. This water conduction takes place in specialized tubes called rhizomorphs, which permit the fungi to move water from a wet or moist area to the dry wood.

All fungi that attack wood need air as a source of oxygen. Generally, this air is in the range of 70-90 degrees F. Decay activity slows at temperatures below 40 degrees F and above 90 degrees F and virtually stops at temperatures below 32 degrees F and above 100 degrees F.

Naturally occurring subzero temperatures merely cause fungi to become dormant, but high temperatures kill them. However, the internal temperature of the wood (not the surface temperature) must be at least 130-140 degrees F and the heat applied for at least 75 minutes after the wood reaches that internal temperature. The temperatures and times in most commercial dry kiln operations reach the lethal temperature for most fungi.

Article by: Fred M. Lamb, Extension Specialist, Virginia Tech Department of Wood Science and Forest Products.

Source: ***Forestry Extension Notes***, Volume 8, No. 1. Virginia Cooperative Extension Service. Winter, 1993.

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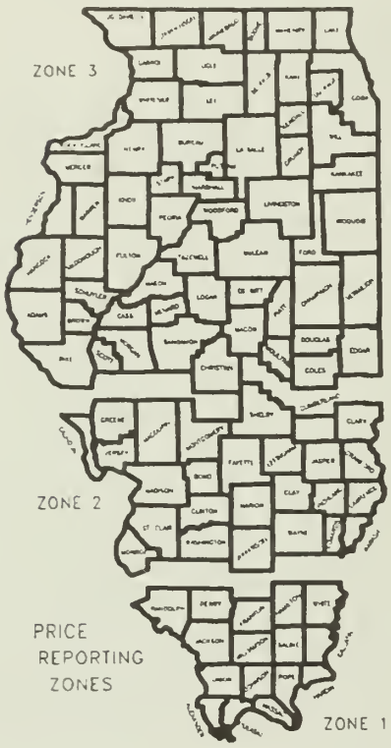
ILLINOIS TIMBER PRICES

June 7, 1993



PRICES PAID ILLINOIS TIMBER PRODUCERS NOVEMBER 1992 THROUGH FEBRUARY 1993

Winter sawtimber prices paid to Illinois timber growers were generally up for F.O.B. Mill and mixed for stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1992 operations, 45% indicated their volume was 500 thousand board feet or more. This is up from 39% in 1991.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	November 1991-February 1992		May 1992-August 1992		November 1992-February 1993	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	133	249	140	255	131	271
Basswood	95	203	84	166	76	177
Beech	46	119	47	127	50	133
Cottonwood	40	119	45	118	43	127
Sweet Gum	55	130	54	131	51	135
Elm & Hackberry	52	134	54	132	52	135
Hickory	52	139	58	134	58	144
Soft Maple	62	148	56	140	61	148
Sugar Maple	87	184	86	177	102	224
Black Oak	105	216	115	192	122	215
Pin Oak	62	128	57	129	55	134
Red Oak	183	312	179	283	189	321
White Oak	183	304	167	272	183	326
Yellow Poplar	104	198	87	161	97	254
Sycamore	47	128	50	124	49	132
Black Walnut	350	506	329	497	334	544
Woods Run Bottomland	62	148	61	131	66	144
Woods Run Upland	113	213	115	181	127	185
FACE VENEER - $ PER M BD. FT.						
Red Oak	421	757	527	763	418	750
White Oak	913	1,428	965	1,503	948	1,556
Walnut	1,511	2,006	1,611	2,330	1,608	2,438
COOPERAGE - $ PER M BD. FT.						
White Oak	196	333	250	425	196	317
UNPEELED PULPWOOD - $ PER TON						
Ton	1.88	14.63	1.95	13.50	2.00	14.67

Timber Prices
November 1992-February 1993
June 7, 1993

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
November 1992 - February 1993

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber				Dollars			
Ash	M bd. ft.	50 - 200	120 - 400	50 - 200	110 - 400	80 - 220	120 - 350
Basswood	M bd. ft.	50 - 75	-	40 - 100	110 - 200	50 - 100	120 - 250
Beech	M bd. ft.	30 - 70	110 - 150	50 - 60	110 - 150	-	-
Cottonwood	M bd. ft.	30 - 70	100 - 150	20 - 70	100 - 160	20 - 50	110 - 150
Sweet Gum	M bd. ft.	30 - 75	110 - 150	25 - 80	110 - 160	-	-
Elm & Hackberry	M bd. ft.	30 - 75	110 - 150	30 - 80	110 - 160	20 - 80	-
Hickory	M bd. ft.	40 - 100	110 - 200	30 - 100	100 - 200	20 - 100	110 - 150
Soft Maple	M bd. ft.	40 - 100	110 - 200	40 - 100	100 - 200	30 - 100	110 - 200
Sugar Maple	M bd. ft.	40 - 200	120 - 350	40 - 200	100 - 350	80 - 180	120 - 300
Black Oak	M bd. ft.	50 - 200	120 - 300	45 - 200	110 - 300	50 - 200	110 - 300
Pin Oak	M bd. ft.	30 - 70	110 - 200	30 - 100	100 - 200	30 - 100	-
Red Oak	M bd. ft.	50 - 300	130 - 470	55 - 300	120 - 450	50 - 300	120 - 450
White Oak	M bd. ft.	50 - 300	130 - 470	60 - 300	130 - 500	50 - 300	120 - 400
Yellow Poplar	M bd. ft.	20 - 150	200 - 300	65 - 150	185 - 300	-	-
Sycamore	M bd. ft.	30 - 70	110 - 150	30 - 70	100 - 160	20 - 50	-
Black Walnut	M bd. ft.	150 - 500	400 - 600	200 - 500	400 - 700	250 - 500	500 - 700
Woods Run Bottomland	M bd. ft.	50 - 100	120 - 150	40 - 100	120 - 160	40 - 100	-
Woods Run Upland	M bd. ft.	50 - 200	120 - 250	50 - 200	140 - 250	100 - 200	-

		STATEWIDE	
		Stumpage	F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	200 - 700	500 - 1,000
White Oak	M bd. ft.	400 - 1,500	750 - 2,000
Walnut	M bd. ft.	500 - 3,000	1,000 - 4,000
3. Cooperage			
White Oak	M bd. ft.	150 - 250	250 - 400
4. Pulpwood			
Unpeeled	Ton	2.00	14.00 - 15.00

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	96
Scribner	3
International	1

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	19	100 - 150
Zone 2	18	100 - 180
Zone 3	24	100 - 200
ILLINOIS	20	100 - 200

VOLUME OF 1992 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	18	32	50	34
100 - 500	20	22	22	21
500 - 1000	21	22	8	17
1,000 - 3000	20	11	9	13
3,000 +	21	13	11	15

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - NOVEMBER 1992 - FEBRUARY 1993

	STATEWIDE STUMPAGE*
Woods Run Upland	$192-$327/M bd. ft.
Woods Run Bottomland	$61-$280/M bd ft

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet
State Statistician

Jay Wells, Garry D. Kepley,
Agricultural Statisticians

"Printed by authority of the State of Illinois," 6/7/93, 1,700, 1,499

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 1, 1995, No. 28

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Karen Colbert

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features information from many sources to help you make informed decisions concerning your woodland resources. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave. Urbana, IL 61801.

How to Plan for Successful Tree Planting

by Kurt Bobsin, Illinois Department of Natural Resources

Forest stewardship is not a new concept to foresters and the landowners they serve. It is an understanding that they are caretakers for the property they hold, that the proper care and use of that land is an obligation to future generations. As Aldo Leopold once said, "That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics." This is the essence of land stewardship.

Tree planting exemplifies the concept of forest stewardship. It is often undertaken to improve existing forest resources, to reestablish forest that is now gone, or to repair some damage resulting from previous land management abuses. Regardless of the reasons for planting trees on your property, there are proper steps that should be followed to increase the chances of success.

A well-planned tree-planting project will help avoid planting failures that lead to disappointment and increased costs. This discussion will offer some guidelines to follow whether you are planting a row of trees as a screen or reforesting a large acreage. It is divided into the planning aspects and the implementation components of a tree-planting project. If you

follow these steps, you will have done all you can to ensure a successful planting that will offer benefits for years to come.

Planning

This is an extremely important part of the planting process. The planting plan is a mechanism by which the planting site is evaluated. Recommendations are then made with respect to the landowner's goals and the capabilities of the site. There are various site factors to consider.

Soils

This is the foundation for the planting. Soil surveys have been conducted for every county by the USDA Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service, SCS). These surveys include soil maps that identify the soil types present on your property. There is information that describes management concerns, tree species to plant, drainage, slope, erosion, and a wide variety of other types of uses and management for the soils on your land. This book should be included in your reference library. It is available through your local NRCS office under the U.S. Depart ment of Agriculture.

Vegetation

The existing vegetative conditions on the planting site influence what must be done to prepare the site for planting. It may also determine the type of weed control that is practiced following the planting.

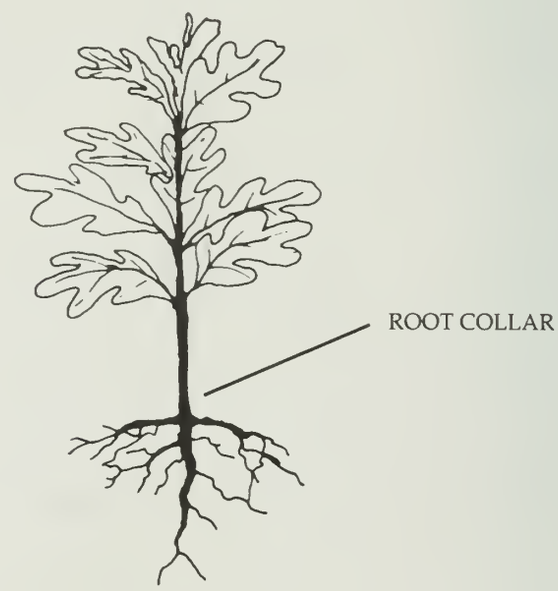
Planting Stock

Trees are sold in a variety of sizes including bare root seedlings, balled and burlapped, and container stock. Bare root seedlings are the most practical for larger conservation plantings. Purchase the largest size stock your budget will allow. If you cannot afford to plant the entire acreage with the minimum size described below, then reduce the size of the area, not the size of the stock. Purchasing stock grown within 200 miles north or south of the planting site is recommended. These constraints do not apply going east and west. Climatic factors are similar to your area over greater distances in those directions.

Tree seedlings are available through a variety of sources. Private nurseries, state nurseries, and local Soil and Water Conservation Districts are several sources. Methods for determining the number of seedlings needed and seedling quality standards are the same for all plantings.

Quality: The general rule of thumb is the bigger the better. Tree seedlings should meet the following mini mum criteria:

1) 12 to 18 inches in height
2) Have a stem caliper (just above the root collar) of 1/4 inch. In most cases, this will require seedlings that are two years old.



Quantity: To determine the total number of seedlings for the project, use the following formula:

$$\frac{\text{43,560 (sq. ft. in one acre)}}{\text{spacing within row X spacing between rows}} \text{ X acres}$$

Example: A 50/50 mixture of pine and hardwoods will be planted on 10 acres. The trees will be spaced 10 feet apart between rows and 10 feet apart within the rows.

$$\text{Total no. of seedlings needed} = \frac{43{,}560}{10 \text{ X } 10} \text{ X 10 acres}$$

$$= \frac{43.560}{100} \text{ X 10}$$

= 4,356 seedlings
or 2,178 pine and
2,178 hardwoods

Species

The species to plant will be determined by your goals and the restrictions of the soils on the planting site. Guidance for species selection can be found in the soil survey. Mix as many species as possible that are compatible for both the purpose and the site. Species diversity not only creates a natural condition but affords insurance against losing the entire planting to insect, disease, or environmental factors. The planting of very large acreages should be staggered over several years. This will ease the impact of loss due to weather extremes.

As you can see, there is much to be considered in planning your tree-planting project. A number of technical assistance programs are available to assist you with the development of a tree-planting plan. Check with your IDNR distrrict forester, extension forester, private forestry consultants, and wood-using industries in your area.

Implementation

Planting should be done during the dormant season when soil and weather conditions are suitable. Spring planting has generally given the best results. Plant as early in the spring as the ground conditions permit. Dates will vary depending upon your geographic location. Planting in frozen ground or under excessively wet or cold conditions should be avoided. Certain sites may be too wet for spring planting, and fall planting is the only alternative. Avoid creating bare soil condi tions under these circumstances. This creates frost heaving problems and increases seedling mortality.

Site Preparation

It is better to delay your planting a year than to proceed on a site that has not been properly prepared. Breaking this rule not only causes disappointment but greatly increases the cost of the project. These costs result from increased maintenance problems or replanting due to poor seedling survival.

The intensity and cost of site preparation work is related to existing vegetation conditions. Site preparation techniques include mowing, burning, plowing, disking, hand clearing, bulldozing, or using herbicides. When bare soil conditions are created, attention needs to be given to potential erosion problems. Temporary vegetative cover such as oats, wheat, or rye may be needed. More permanent cover should include grasses that are less competitive with tree seedlings, such as bluegrass, redtop, timothy, or orchardgrass. Visit your local NRCS office to get specific seeding and fertility rates for your area. Once the site has been properly prepared, you are ready to begin planting.

Tree Care

It is extremely important to plant the trees as soon as they arrive. If planting must be delayed for more than a week, the seedlings should be put into cold storage. Otherwise, keep the seedlings in a cool, dry place until you are ready to go to the field. Once you are on site, remove the seedlings from the shipping material and place them in a tub with water. Keep the root systems moist at all times. Do not prune off the roots which you paid for by purchasing larger stock to begin with. If it is absolutely necessary to root prune, maintain a minimum 8-inch root length. Do not simply prune your seedlings to fit the type of hole your tree planting equipment is creating. Use the proper type of equip ment to plant the size of the seedlings you have care fully purchased.

Planting Techniques

There are two choices: hand planting and machine planting. If conditions warrant hand planting, 500 trees would be a good day's work. Expect to plant several thousand or more with a machine. However, there are many factors that affect this production rate. Hand tools include power augers, hoe dads, dibble bars, tree shovels, and tree bars. Tree bars are very widely used for planting bare root stock. Machines are good for covering large areas but do not eliminate hand planting altogether. Hand planting will be needed to fill in skips, inaccessible spots, and in areas that resulted in poor results with the machine.

Whatever technique or method is used, the finished planting must

meet the following minimum standards.

Firmness: The soil around the seedlings' roots must be firmly packed and sealed to eliminate air pockets. The seedling must be able to withstand a moderate tug with the thumb and index finger.

Depth: Seedlings must be planted at the same depth as grown at the nursery. The nursery soil line can be distinguished by a color change on the stem near the top of the root system. This is known as the root collar. At no time should a seedling be planted with the roots exposed, sunk in a hole, or raised in a mound.

Root Position: Seedling roots must not be bunched, curled, doubled (formed into a "J"), twisted, or flattened into a plane (formed into a "L") in the hole. All roots should be pointing downward.

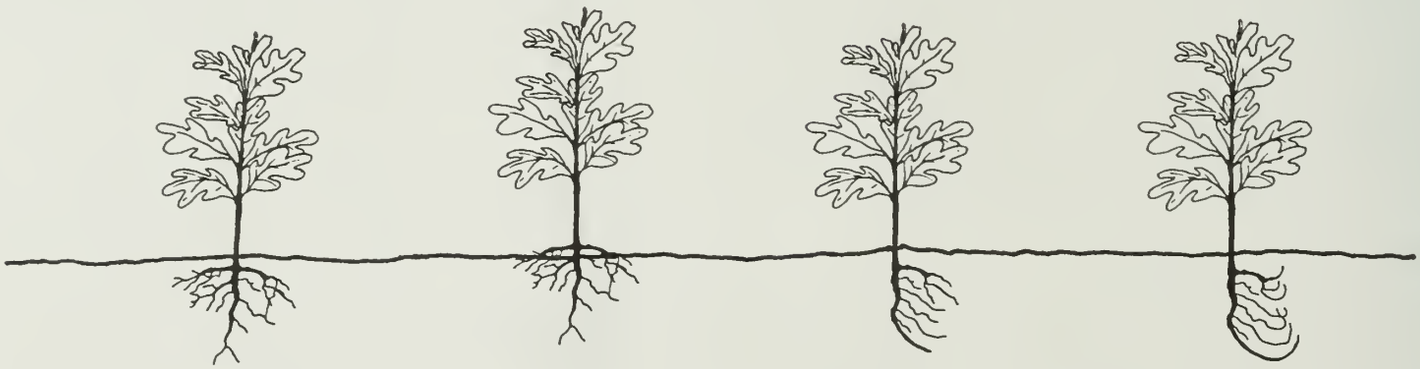
Crown Position: The seedling should be planted so that the stem is in an upright position with little to no lean from the center.

Patterns

The distribution and location of the species on the planting site will be determined by soil types, topography, the objectives, and personal preferences. Species may be mixed within rows, placed in alternating rows, or planted in blocks. This applies to the use of hardwoods, conifers, or a mixture of both. The important thing to remember is to combine different species that are compatible with each other and with the location on the planting site. Slope position would illustrate this point. Some species grow better on the lower portion of the slope and others on the upper slope. Planting on the contour, especially when machine planting, is recommended. This will alleviate scouring and erosion down the furrow that can be created with a planting machine.

Spacing

It is important to plant in defined rows to facilitate follow-up maintenance such as mowing or herbicide applications. Although this may tend to create an artificial appearance,



Corrrectly planted seedling | Planted too shallow, roots exposed | " L" Roots | " J" Roots

this is temporary and will diminish over time as natural mortality and future thinnings occur.

The cost of planting is directly related to the number of trees planted per acre. This number is determined by the spacings within and between rows. Space trees to fit your equipment and to attain a well-stocked stand of quality trees. Densities will also affect follow-up cultural costs such as thinning, pruning, and shearing in the case of Christmas trees. Listed below left are suggested tree densities for several planting goals.

GOAL	TREES PER ACRE
Chistmas trees	1,200 - 1,400
Walnut plantations	200 - 550
Hardwoods	435 - 700
Conifers	500 - 800
Hardwood - Conifer Mix	435 - 700
Fuelwood	1,000 - 1,200

Weed Control

This is a critical element to successful plantings and one factor that you have the ability to control. Periodic mowing throughout the growing season is needed to keep weeds from overtopping the seedlings and "smothering" the sunlight. Keeping the areas between the rows open also exposes rabbits and mice to predators. These animals can do serious harm to the seedlings during establishment. The number of mowings needed each growing season will be influenced by weather conditions. Mow early the first time. This will make it easy to find the center of the rows later. Early mowing also prevents wildlife nesting that will be disturbed and destroyed with subsequent mowings during the growing seasons. Additional mowings must be implemented when the vegetation reaches a height of 12-18 inches.

Mowing alone is not considered adequate weed control. Vegetation within the row competes with the seedling roots for moisture and nutrients below the ground. The choice between the use of mulch or herbicides is a personal one. There are advantages and disadvantages to both. The practical choice for large plantings is a herbicide application. Training in the use and application of herbicides should be obtained before you attempt to do this yourself. Such training will provide you with some general knowledge about how herbicides work and under what conditions. Due to the complexity and detail needed to fully address herbicide use, it would be best to consult with local forestry experts to obtain information for your individual needs and conditions. Weed control should be continued for at least the following two growing seasons or until the seedlings are up and over the competing vegetation. At this time you will be delighted to see the shape of your forest taking place.

Financial Assistance

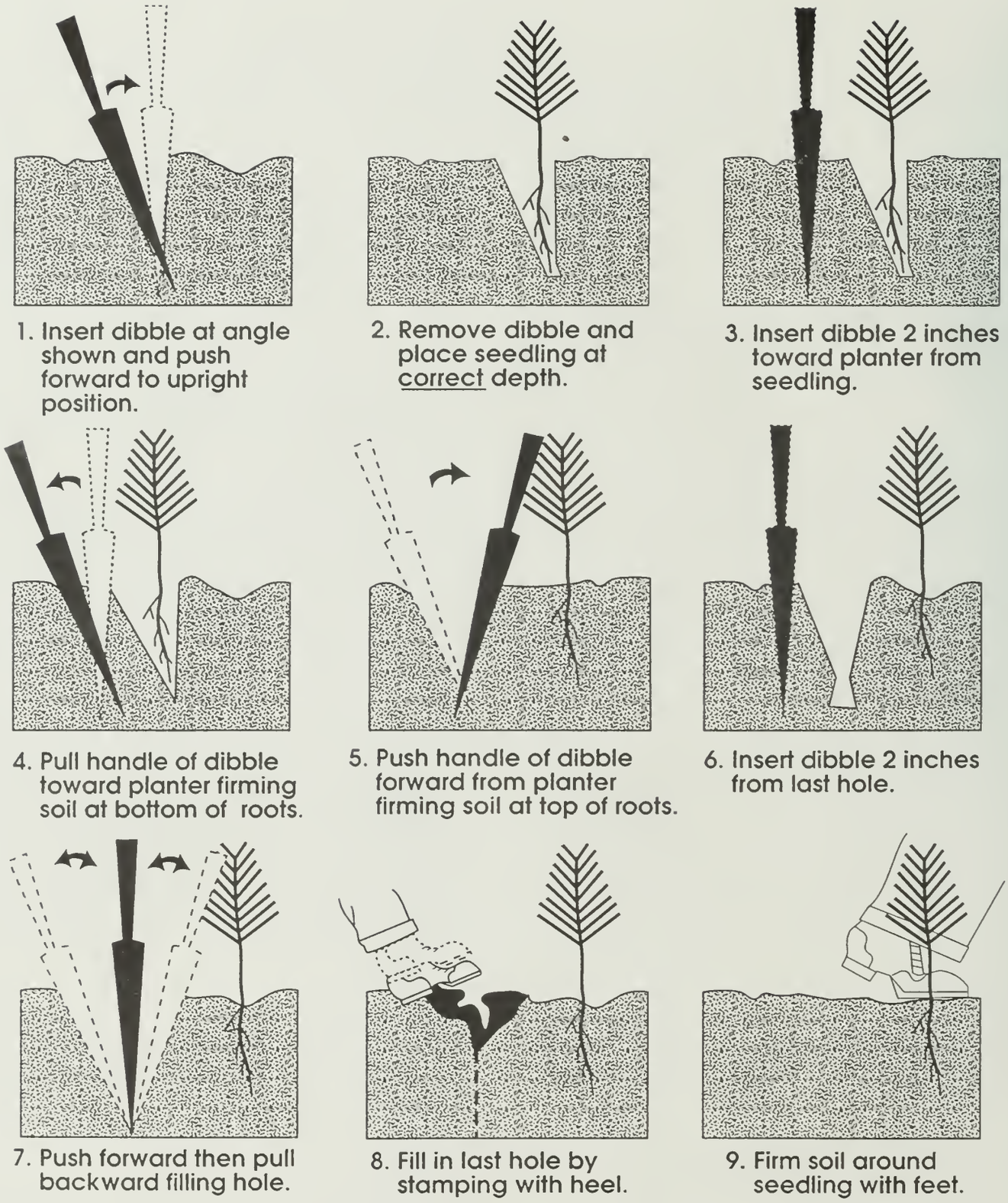
Due to the fact that investments of time and money into forestry practices are long term, finances are of particular concern to forest landowners.

Private nonindustrial forest landowners own nearly 58 percent of the forest resources nationwide. This figure rises dramatically in Illinois—over 90 percent. The federal government has historically funded programs to encourage private landowners to manage and establish forestland. The Forest Stewardship program continues this commitment through the Stewardship Incentive Program (SIP).

Landowners with Forest Stewardship plans are eligible to participate in the SIP cost-share program. Costs incurred for developing a tree planting plan and tree planting expenses are covered under SIP. A landowner must apply and receive approval before proceeding with an eligible practice. This is done through the Consolidated Farm Service Agency (CFSA) offfice under the USDA office in your county. A landowner may be reimbursed up to 75 percent of expenses. Contact your IDNR district forester or consulting forester for further information.

Tree planting is no easy task. It requires careful planning, diligent execution, and persistence. Professional tree planting contractors are available to do many of the things discussed. Technical forestry assistance and financial help are readily available. There really is no reason to delay your tree-planting project. The best time to plant a tree was 20 years ago. The second best time is NOW!

(Adapted from Midwest Forest Stewardship Conference Proceedings, March 12, 1994)



Planting a bare-rooted seedling with a planting bar (from USDA Handbook 247 and Ohio CES Publication 4H614).

PARTIAL LIST OF PRIVATE SEEDLING NURSERIES PROVIDING STOCK SUITABLE FOR CONSERVATION PLANTING IN ILLINOIS

This listing is provided as a public service by the Illinois Department of Natural Resources and this newsletter, and is not to be construed as an endorsement, approval or guarantee of the services provided by company listed.

Armintrout's Evergreen Nursery
1156 Lincoln Road
Allegan, MI 49010
616/673-6627

Carino Nurseries
P.O. Box 538
Indiana, PA 15701
412/463-3350
412/463-3050 FAX

Forrest Keeling Nursery
Hwy 79 S, Box 135
Elsberry, MO 63343
800/356-2401
314/898-5803 FAX

Hensler Nursery
5715 N. 750E
Hamlet, IN 46532
800/847-4192

Lawyer Nursery, Inc.
950 Hwy 200 West
Plains, MT 59859
406/826-3881
406/826-5700 FAX

Miller Nurseries
P.O. Box 66
Germantown, WI 53022
414/255-4360

Musser Forests, Inc.
P.O. Box 340, Route 199 North
Indiana, PA 15701
412/465-5686
412/465-9893 FAX

Vans Pines, Inc.
7550 144th Ave.
West Olive, MI 49460
616/399-1620
616/399-1652 FAX

Boyd Nursery Company
P. O. Box 71, Hwy. 55
McMinnville, TN 37110
615/668-9898
615/668-7646 FAX

Cascade Forestry Nursery
22033 Fillmore Road
Cascade, IA 52033
319/852-3042
319/852-3042 FAX

Forest Nursery Company
Route 2, Box 118A
McMinnville, TN 37110
615/473-4740
615/473-2133 FAX

Illinois Forest Products
R.R. 1, Box 312
Beardstown, IL 62618
217/323-4540

Mellingers, Inc.
2310 W. South Range Road
North Lima, OH 44452
216/549-9861
216/549-3716 FAX

Mt. Arbor Nurseries
400 North Center
Shenandoah, IA 51601
800/831-4125
712/246-1841 FAX

Smith Nursery Company
Box 515
Charles City, IA 50616
515/228-3239

Warren County Nursery
Rt. 2, Box 204
McMinnville, TN 37110
615/668-8941
615/668-2245 FAX

Recommended sites for planting various tree species in Illinois.[1]

	Planting Site								
	Upland							Bottomland		
	Poor Site/Thin Dry Soil			Good Site/Deep Well-Drained Soil			Poorly Drained			
Species	Level	N&E	S&W	Level	N&E	S&W		Well Drained	Poorly Drained	Comments
Conifers										
Baldcypress				S	S	S	S	S		Adapted to poorly drained soils. Will grow well on better drained soils. Chlorotic cond
Douglas-fir						S				Requires good site; avoid frost pockets; primarily Christmas tree or windbreak.; southw
Pine, Austrian	S	S	S	S	S	S				Tolerates highest pH of pines, about 8.0; will grow on limestone soils.
Pine, Red	S	S	S	S	S	S				Requires acid soil for good growth; will grow on shallow dry soils; does not do well on
Pine, Scotch	S	S	S	S	S	S	L	S		Will tolerate wettest sites of any pine; will tolerate pH up to about 8.0; mostly used for C nematode after age 15.
Pine, White	S	S	S	S	S	S		S		Will outgrow all other pines on upland soils in Illinois except on driest sites.
Redcedar, Eastern	S	S	S	S	S	S		S		Will grow on very dry infetile sites and on soils with high pH; primarily used for fence
Spruce, Blue				S	S	S	L	S	L	Primarily Christmas tree or ornamental.
Spruce, Norway		S		S	S	S	L	S	L	Primarily windbreak planting or ornamental..
White-cedar, Northern				S	S	S	S	S	S	Primarily for windbreaks and fence posts.
Broadleaves										
Ash, Green				S	S	S	S	S	L	Adapted to a wide variety of moisture conditions.
Ash, White				S	S			S		Prefers deep, well-drained soils.
Cottonwood				S	S		S	S	S	Adapted to variety of soil moisture conditions, but poor choice for very dry sites; will t
Locust, Black	S	S	S	S	S	S			S	Will grow well on moist soils except wet; tolerates wide range of soil pH; borers can be
Maple, Red	S	S	S	S	S	S	S	S	S	Adapted to a wide variety of sites; rapid growing.
Maple, Silver		S		S	S	S	S	S	S	Very rapid growing; will survive in very wet soils.
Maple, Sugar				S	S			S		Requires fertile, well-drained soil; will not do well on hot, dry, windy sites.
Oak, Black	S	S	S	S	S	S				Will grow on relatively dry slopes and ridges.
Oak, Red				S	S	S	L	S		Requires sites of moderate fertility and moisture; one of the most rapid growing native
Oak, White		S		S	S	S		S		Adapted to wide variety of conditions; will probably tolerate driest sites of any commo
Sweetgum				S	S			S		Tolerates poorly drained soil conditions; best suited to southern third of the state; wint
Sycamore				S	S		S	S	S	Tolerates poorly drained soil conditions.
Tuliptree (Yellow-poplar)				S	S			S		Requires fertile, well-drained soil; will not do well on hot, dry, windy sites; timber tree northern two-thirds of Illinois.
Walnut, Black				S	S			S		Requires deep, fertile, well-drained soil; will not do well on hot, dry, windy sites; stron before hardpan or bedrock..
Willow				S	S	S	S	S	S	Will tolerate very wet sites, even frequent flooding.

1 An "S" indicates the species is well suited to the site and should do well if planted on that site. No letter indicates the specie is not suited to the site and normally should not be planted on that site. An "L" indicates the species is limited in its suitability for the site - probably not the best choice Most "L" designations are on poorly drained soils and are included to provide some species choice. Expect "L" species on poorly drained soils to grow more slowly and have poorer foliage color (Table adapted from Ohio CES Publica

r pH soils.
ource prefered.

s; severely infested by pine wood

al screening.

ooding.
r age 10.

ree seedlings.
rthern third of Illinois.

ird of the state; ornamental tree in

es that needs 30-36 inches of soil depth

d grow on the site under most circumstances, but is

ILLINOIS VALLEY WOODLAND EXPO

Mark your calendar for the Illinois Valley Woodland Expo on Saturday, August 28,1995 from 8 a.m. to 8 p.m. The Expo will be held at the Marshall-Putnam Counties Fairground in Henry, Illinois. The theme of the Expo is "The Pleasure, Profit, and Products of Good Woodland Stewarrdship".

There will be a multitude of activities for you to enjoy. Scheduled seminars include: Recreation Opportunities, Alternative Forest Products, Agro-Forestry: Helping to Pay the Bills While the Trees Grow, Wildlife Management, Riparian Management to Protect Your Property, Growing Blue Ribbon Trees, Restoration of Native Plants and Animals, Urban Forestry: Construction in Natural Settings, and Federal Income Tax as it Relates to Forest Production. Live demonstrations will include woodworking, sawmilling, chainsaw safety, wood carving, and many others. Ther will be a Wood/Natural Crafts Marketplace with crafters and artisans displaying, demonstrating, and selling their work. Featured attractions include: Scheer's Lumberjack Show, chainsaw carving, University of Illinois Conclave Team demonstration, and musical entertainment. For the younger generation, there will be a Birdhouse Building Workshop, and special activities with a storyteller and frontiersmen from the 1600s.

Marty Travis, internationally known re-creator of Shaker furniture and boxes, will be a featured crafter at the Expo. Travis, of rural Fairbury, is a "complete woodsman". He utilizes cherry, pine and maple from the woods of his 1830s family farm for much of his work. Marty is a woodland steward who has replanted over 10,000 trees from seed on his property to ensure trees for future generations. Travis has earned acclaim for his historically correct shaker pieces because of his demand for absolute accuracy in reproduction. His work has been featured in the New York Times, Country Living Magazine, and Early American Life Magazine. His work in included in several Eastern museums, and U.S. and British shops.

Dick Sing, a professional woodturnerr will be on hand turning and answering questions. He plans to turn some of the less common and underutilized species such as redbud, mulberry, and buckthorn. There will even be a burl or two cut into turning material on one of the sawmills and turned into something special. The American Academy of Woodworking will be building a traditional cedar strip canoe. Their jigs, special clamps, and gluing techniques will be invaluable to woodworkers of all types. Several sawmillers will be demonstrating regular as well as specialty sawing techniques to get you the product you want from your own logs. A wide range of central hardwood species will be cut. This will be the perfect opportunity to see the differences in color, texture, and grain pattern. Many of the sawn logs will be auctioned or given as door prizes at the Expo.

The Illinois Valley Woodland Expo will be a chance for people to learn about good woodland stewardship through traditional and non-traditional management methods. The public will be able to see that even though logs for lumber are part of many "working forests", there are a wide range of other "forest entities" that can bring pleasure and profit without cutting down entire forests. Admission is only $1.00. If you are a natural crafter or woodworker and would like to demonstrate, display or sell or would like more information, call Prairie Rivers RC&D at 309-364-3979.

The Illinois Valley Woodland Expo is being coordinated by Prairie Rivers Resource Conservation and Development in partnership with the U.S. Forest Service, Illinois Department of Natural Resources, area Soil and Water Conservation Districts, Cooperative Extension Service, Natural Resources Conservation Service, Illinois Forestry Consulting, and the Illinois Council on Forestry Development.

The Consulting Forester

The category is "a thing." You want to buy a vowel— an A. Vanna turns over two. The board now reads FIP CRP ACP WRP FDA SIP. Can you solve the puzzle? If you're a "Wheel of Fortune" fan, don't belabor over this puzzle for long because another consonant or vowel won't solve it. This alphabet soup represents federal and state cost-share programs that have many Illinois landowners thinking, talking, and practicing forest management on their property. Many more are eagerly waiting to get started.

Because there are so many landowners requesting assistance from the Department of Natural Resources's (DNR) district foresters, it's no wonder the wait for service has raised landowners' frustration level to the point that some are letting their representative and senator know their dissatisfaction. But to be fair to these hard-working professionals, 22 district foresters can only begin to make a dent in the service requests generated annually by Illinois' 160,000 private woodland owners.

If you are or may soon be one of these frustrated landowners, take heart—there is light at the end of the tunnel. Why not consider the services of a consulting forester? I frequently make this suggestion to landowners who are tired of waiting and are anxious to move ahead with their forestry goals. Their response usually is, "I didn't know there were such people. What can they do to help me?"

Independent Business Professionals

Consulting foresters are independent professionals who charge fees based on the services they provide for their clients. Landowners who have grown up with no-cost service provided by various federal and state agencies such as the Natural Resources Conservation Service (NRCS formerly SCS) or the DNR may not like the thought of paying for service that was free (if you're willing to discount the taxes we pay to support these services) in the past. Fortunately, there are cost-share programs available that can help defray part of the cost involved in meeting the goals you havc set for the land.

Because consulting foresters are independent professionals, they can do as little or as much as you desire without being constrained by the possible conflicts of interest that can quickly confront government employees. For example, in the case of a timber sale, the consulting forester serves as liaison between you and the timber industry, an entity most land owners know very little about. If you're interested in selling timber from your property, a consulting forester can:

- do an inventory and mark the timber in accordance with your goals and the physical attributes of the resource
- locate and mark all property boundaries
- determine the timber's value
- merchandise the timber based on the types of products that could be cut from it
- advise you on the track record of timber buyers bidding on the sale
- administer the actual sale for you
- negotiate a written contract with the buyer who has been approved by your legal counsel
- frequently monitor the harvesting operation for compliance with the terms of the contract
- testify in your behalf in court if there are any disputes resulting from the timber sale
- assist you with the preparation of federal and state income taxes resulting from the sale
- recommend any postharvest prescriptions that will be necessary to ensure a healthy, vigorous future forest

The DNR district forester could handle the first and last items above for you, but the rest go beyond the services he or she can provide as a government employee. Similarly, the district forester will provide you with a list of the most recent timber prices, which will allow you to make gross calculations as to the value of your timber, and he or she can provide copies of sample contracts to review and consider, but the district forester cannot serve as your business agent or counsel. You and your attorney should review the sample contracts care fully. You may need to make changes in the contract to reflect your personal needs and any unusual conditions that might exist in your woodland.

Consulting foresters can perform a broad range of services for you:

- develop your land-management plan
- inventory and appraise timber

- mark timber for sale and/or timber stand improvement (TSI)
- assist with or conduct your timber sale
- manage your timber in accordance with your goals
- conduct periodic TSI practices
- plant trees and maintain a weed-control regime
- provide other services, which might include Christmas tree management; wildlife management; recreation management for incrcased biodiversity and threatened and endangered species; timber income tax preparation; estate planning; surveying, including locating property boundaries; land appraisal for sale or purchase; and serving as an expert witness in court

Not all consulting foresters will perform all the above services for you. Some specialize in only one or more of the services. Some are in the business on a part-time basis, others make consulting their sole livelihood. A consulting forester may belong to the Association of Consulting Foresters (ACF), a voluntary national organization that maintains very strict membership guidelines and a code of ethics. Others may not join ACF but may belong to their own state affiliation of consulting foresters. State organizations maintain membership guidelines and have definite organization objectives. Some may elect to belong to both organizations. Still other consultants may operate independent of any organization. Illinois does not require a consulting forester to be licensed to work in the state, so you are advised to ask for a list of references prior to any agreement on work to be done. Satisfy yourself that this is an individual you want to work with and who will do a good job helping you to manage your land. Then enter into a signed, written contract with the consultant, so you both know what was agreed to.

Forester Fees

Eventually, any discussion of consultants focuses on the fee they charge for their services. These fees can be grouped into three basic categories: time and expenses; lump sum or flat fee; and commission or percentage basis.

Time and expenses means the consultant will charge an agreed-upon rate for his or her time spent completing the job, in addition to compensation for travel expenses incurred such as mileage, overnight lodging, or meals.

Lump sum or flat fee means the landowner agrees to pay a certain dollar amount for a job. For example, if a landowner asks a consultant to inventory woodland and determine the timber's value, but the owner handles the rest of the timber sale, the consultant would likely charge a specific rate (hourly or daily) or a lump sum amount for his or her service. Normally, the fee will not change even if it takes the consultant more or less time to do the job than anticipated.

A commission or percentage basis normally involves services associated with a timber sale. If a landowner hires a consultant to handle the entire sale, it is normal practice to enter into a commission or percentage of the sale agreement. The consultant receives an agreed-upon percentage of the gross sale receipts. This commission is negotiable and will fluctuate depending on the amount and grade of timber available for sale. Commissions might run from 20 percent for small-volume sales or poor-quality timber to between 8 and 12 percent for large-volume sales or high-value timber, which might include walnut and red or white oak veneer.

Of the above fee types, flat fee and commission are the most common.

There is a wide range in hourly and daily rates charged by consultants. This range is based on numerous factors that might include the nature of the work or job to be done; the distance the consultant must travel; the equipment and associated supplies and/or chemicals needed; the number of employees the consultant maintains (if any); etc. Many of the services listed above are contracted on a dollar-per-acre basis. Usually, the more acreage that is involved, the lower the per acre rate charge.

Each consultant's fee will be different because it is based on his or her own circumstances. However, as independent professionals, they have a good handle on the rate their competition charges and what the market will bear, so you can expect their fees to be competitive. Landowners considering the services of a consulting forester should establish the fee before entering into any written contract or approving the start of any work.

One real attraction of consultants is that most can get to your job fairly quickly, and if you take part in one or more of the cost-share programs, there is money available for many of the services they provide. This means less out-of pocket expense for you! **A few key points to remember about cost-**

share assistance:

- you must have a DNR-approved management plan for your property to qualify for most of the forestry cost-share assistance programs
- the cost of preparing your management plan can be cost-shared, but only if you obtain DNR approval **prior** to beginning work on the plan
- you should not begin any of this work prior to formal sign-up for the specific cost-share program and approval of your management plan by the DNR.

On the following page is a list of both in-state and out-of-state consulting foresters practicing in Illinois. This list is maintained by the DNR's Division of Forest Resources and is by no means inclusive and does not imply endorsement of the consultants by the state,this newsletter, or this author.

There are many exciting opportunities out there for forest landowners. If you're ready to push ahead with your forestry goals, give a consulting forester a call today! By the way, here's how to decipher the alphabet soup puzzle: FIP Forest Incentives Program, CRP-Conservation Reserve Program (currently under consideration for reauthorization), ACP-Agricultural Conservation Program, WRP-Wetlands Reserve Program, FDA-(Illinois) Forestry Development Act (Program), SIP-Stewardship Incentives Program. Your local CFSA office, DNR district forester, or consulting forester can give you more details on how these programs might help you accomplish your forestry goals and how you might qualify for them.

Michael Bolin is an Extension forestry specialist with the University of Illinois Department of Forestry in Urbana and a managing editor of The Illinois Steward magazine.

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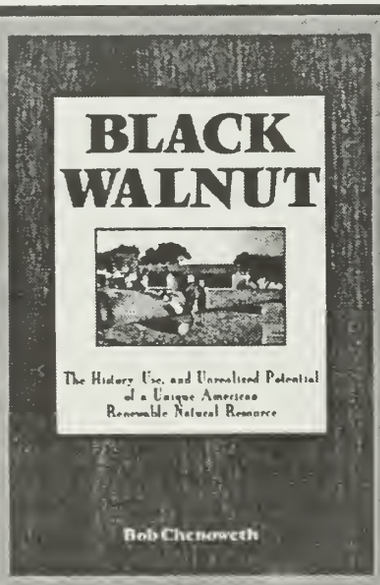

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BLACK WALNUT

The History, Use, and Unrealized Potential of a Unique American Renewable Natural Resource

by Bob Chenoweth

BLACK WALNUT provides important reference information and interesting reading about *Juglans nigra* (the Eastern black walnut) for woodland owners, foresters, forestry students, timber buyers, woodworkers, naturalists, conservationists, environmentalists, protectionists, botanists, gardeners, squirrel lovers, deer hunters, walnut lovers, and anyone who simply enjoys a good book. Chenoweth, a black walnut farmer and lover, has spent three years researching and writing this book. Includes more than 300 pages and an 8-page color photo section! Read and learn:

- ***Native American use and unintentional culture of walnuts***
- ***The role of white-tail deer in walnut history***
- ***The importance of black walnut lumber in young America***
- ***How to manage your woodlands for more and better walnut trees***
- ***The production and value of walnut veneer and nutmeats***
- ***Why quality black walnut trees are more rare now than ever***
- ***And much, much more!***

List of Consulting Foresters

List provided by Illinois Department of Natural Resources, Division of Forest Resources.

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*** indicates members of Illinois Consulting Foresters, Inc.)

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U.S. DEPARTMENT OF AGRICULTURE
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ILLINOIS TIMBER PRICES

ILLINOIS
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CONSERVATION
life and land together

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361

June 15, 1995

PRICES PAID ILLINOIS TIMBER PRODUCERS
NOVEMBER 1994 THROUGH FEBRUARY 1995

Winter sawtimber prices paid to Illinois timber growers were generally unchanged or slightly lower for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1994 operations, 44% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	November 1993-February 1994		May 1994-August 1994		November 1994-February 1995	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	178	296	170	315	160	280
Basswood	112	193	130	240	100	220
Beech	65	164	50	170	70	160
Cottonwood	47	134	50	155	45	140
Sweet Gum	66	160	60	165	75	155
Elm & Hackberry	67	155	60	165	75	160
Hickory	73	166	70	185	70	175
Soft Maple	80	168	80	175	85	195
Sugar Maple	125	257	120	255	110	225
Black Oak	147	273	145	250	130	265
Pin Oak	76	154	75	160	75	165
Red Oak	230	378	215	365	245	400
White Oak	207	319	200	310	195	335
Yellow Poplar	130	238	140	285	100	240
Sycamore	62	148	60	155	60	175
Black Walnut	379	560	345	545	300	545
Woods Run Bottomland	84	176	80	170	75	160
Woods Run Upland	161	265	120	200	120	200
FACE VENEER - $ PER M BD. FT.						
Red Oak	584	1,075	610	1,100	700	870
White Oak	1,036	1,734	980	1,800	920	1,680
Walnut	1,580	2,270	1,700	2,300	1,600	2,090
COOPERAGE - $ PER M BD. FT.						
White Oak	279	400	220	400	190	400
UNPEELED PULPWOOD - $ PER TON						
Ton	2.25	15.00	2.60	16.50	1.60	15.00

Timber Prices
November 1994-February 1995
June 15, 1995

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
November 1994 - February 1995

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber				Dollars			
Ash	M bd. ft.	100 - 290	150 - 450	100 - 300	160 - 400	130 - 200	190 - 300
Basswood	M bd. ft.	50 - 100	200 - 230	50 - 200	180 - 220	50 - 200	150 - 300
Beech	M bd. ft.	30 - 100	140 - 200	50 - 100	140 - 200	50 - 100	100 - 180
Cottonwood	M bd. ft.	20 - 50	100 - 150	50 - 80	120 - 180	20 - 50	120 - 150
Sweet Gum	M bd. ft.	50 - 100	100 - 200	80 - 100	100 - 190	50 - 100	100 - 180
Elm & Hackberry	M bd. ft.	30 - 120	140 - 200	60 - 100	130 - 190	30 - 150	150 - 190
Hickory	M bd. ft.	30 - 110	150 - 200	60 - 100	160 - 180	30 - 50	150 - 190
Soft Maple	M bd. ft.	30 - 120	140 - 200	60 - 120	160 - 200	40 - 130	280 - 300
Sugar Maple	M bd. ft.	50 - 150	150 - 300	60 - 130	150 - 320	80 - 200	190 - 350
Black Oak	M bd. ft.	50 - 200	200 - 450	80 - 200	140 - 450	80 - 200	190 - 250
Pin Oak	M bd. ft.	40 - 120	140 - 200	50 - 100	150 - 200	50 - 120	180 - 200
Red Oak	M bd. ft.	70 - 300	250 - 450	200 - 400	400 - 450	100 - 400	320 - 500
White Oak	M bd. ft.	70 - 300	250 - 450	60 - 300	350 - 400	110 - 300	250 - 300
Yellow Poplar	M bd. ft.	30 - 150	120 - 300	70 - 150	190 - 250	NA	NA
Sycamore	M bd. ft.	30 - 100	150 - 200	50 - 100	100 - 220	30 - 70	200 - 210
Black Walnut	M bd. ft.	200 - 400	400 - 650	250 - 400	500 - 650	250 - 400	450 - 550
Woods Run Bottomland	M bd. ft.	45 - 100	125 - 180	60 - 150	120 - 250	55 - 100	NA
Woods Run Upland	M bd. ft.	50 - 200	150 - 350	60 - 250	120 - 350	110 - 180	NA

		STATEWIDE	
		Stumpage	F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	300 - 1,000	800 - 1,400
White Oak	M bd. ft.	350 - 2,000	800 - 2,400
Walnut	M bd. ft.	400 - 3,000	1,050 - 3,000
3. Cooperage			
White Oak	M bd. ft.	150 - 220	NA
4. Pulpwood			
Unpeeled	Ton	1.00 - 2.00	NA

NA: No Reports

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	100
Scribner	0
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	8	100 - 200
Zone 2	14	100 - 180
Zone 3	4	150 - 200
ILLINOIS	25	100 - 200

VOLUME OF 1993 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	25	25	57	30
100 - 500	25	31	15	26
500 - 1,000	25	19	14	21
1,000 - 3,000	10	19	14	14
3,000 +	15	6	0	9

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - NOVEMBER 1994 - FEBRUARY 1995

	STATEWIDE STUMPAGE*
Woods Run Upland	$119-$461/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 2, 1995, No. 29

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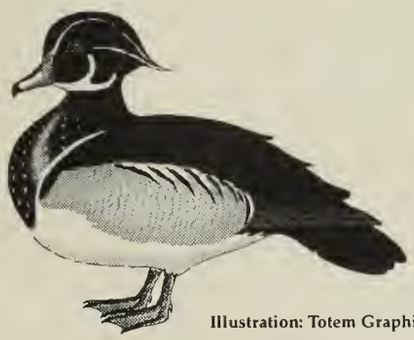

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Illinois Forest Management Newsletter is produced by the University of Illinois Department of Natural Resources and Environmental Sciences and the Cooperative Extension Service. The newsletter features information from many sources to help you make informed decisions concerning your woodland resources. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave. Urbana, IL 61801.

A Touch of Garlic

by Susan L. Post

On April 30, 1983, during our usual spring photography and botanizing in Lodge Park, Piatt County, my husband and I encountered a new plant. Along our favorite wildflower slope, amid the bluebells, trilliums, and bellwort, was some type of mustard.

After consulting a well-thumbed plant key, we identified the plant as garlic mustard, *Alliaria petiolata*, a species originally from Europe. We didn't think much of our encounter except that we had seen a plant to add to our list.

In subsequent years, however, garlic mustard started appearing, not as a few isolated plants, but as whole colonies displacing our favorite blooms. A sea of Virginia bluebells was now only small islands in waves of garlic mustard, and the large expanses of blue-eyed Mary's at the county's Allerton Park were slowly diminishing. Realization soon struck. Garlic mustard was taking over our favorite spring woodland wildflower sites!

To the uninitiated, garlic mustard sounds like a delicious herb. Its common name refers to the plant's strong garlic fragrance when crushed. Even while searching the University of Illinois library, the name garlic mustard referenced not deciduous forest pests or alien weeds but seasoning in such magazines as *Bon Appetit* and *Gourmet*. To veterans of

the outdoors, though, garlic mustard has a very different meaning. In the words of John Taft, Illinois Natural History Survey botanist, garlic mustard is the "plant from hell."

The first collection of garlic mustard in the United States was made on Long Island, New York, in 1868. It is speculated that well-intentioned European settlers brought the plant with them for food or medicine when they came to America. Europeans used the leaves on bread to make sandwiches called "sauce alone." The leaves were also added to lettuce, mutton, and pork to give them flavor. Leaf juices were taken alone or boiled into a syrup with honey as a treatment for dropsy. By 1918, the plant was collected in Illinois' Lake County, the first known occurrence west of central Kentucky.

Twenty-five Illinois field botanists did not even include it as one of the most problematic exotic plants in the state in a 1986 survey; nor was it listed as one of the 27 most serious exotic weeds during a 1988 survey. Like a well-camouflaged army, garlic mustard invaded our woods and natural areas. By 1991 it was in 31 percent of Illinois state parks, 30 percent of Illinois nature preserves, and 44 Illinois counties.

Garlic mustard is known to occur in shaded counties as of 1995.

Biennial or Winter Annual?

Like the control of garlic mustard, the classification of the plant is difficult. Is it a biennial or a winter annual? (A winter annual is a plant that germinates and establishes itself in the summer of one year, overwinters, flowers, and dies the following year.) In Illinois, the life span of an individual garlic mustard plant is from spring of one year to fall of the next year. Seed germination coincides with the emergence of spring beauty *(Claytonia virginia)*. During the first summer through the winter, all that is visible of the pest is a cluster of rounded to heart-shaped leaves (called a rosette) with course, round, irregular teeth on the margins. The leaves are approximately 2 to 8 inches long. (This past summer's drought may have been a blessing as far as garlic mustard is concerned because first-year rosettes are sensitive to drought.) In the spring, plants that survived the winter send up a flowering stalk 1 to 2 feet tall. The leaves on the stalk are alternate and gradually become smaller and narrower. Flowers are small, four-petaled, and white, much like those of a radish gone to seed, and the flowers cluster at the top of the stem. The seeds develop in slender capsules called siliques. The siliques are 1 to 2 1/2 inches long and contain a single row of oblong black seeds.

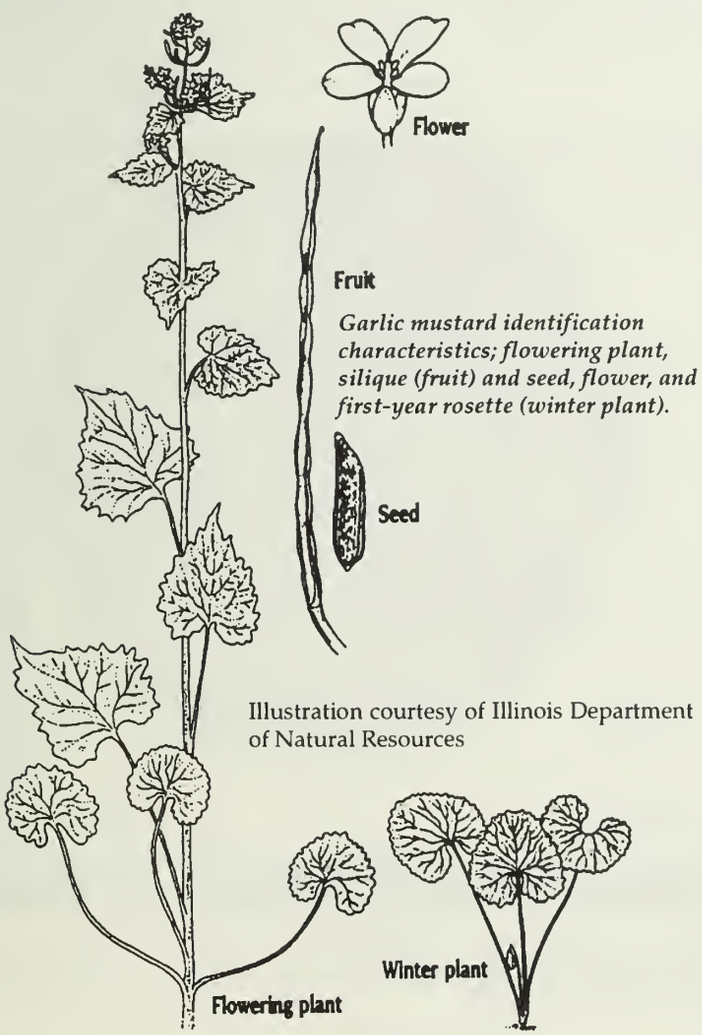
Garlic mustard spreads exclusively by seed. The plants produce an average of 350 seeds, with some plants producing nearly 8,000 seeds! Each seed has an impermeable seed coat and grooves on the outside that trap air, enabling the seed to float for short periods. The seeds ripen and disperse between mid-June and late September. Seeds are expelled from the siliques by falling from the plant or by being expelled when the plant is brushed. Once on the ground, the seeds may be picked up on the fur and feet of mammals, on the boots or in the pant cuffs and pockets of hikers, by mud-encrusted vehicle tires, or by flowing water. Seeds remain dormant in the soil for an eight- to 20-month period, depending on the locality. After this dormant period, most seeds will germinate within two years, but some may remain viable for up to five years. Thus, population levels are never constant due to the biennial nature of the plant and the variable seed germination.

An Opportunistic Plant

Garlic mustard is an extremely aggressive species that has invaded our northern and central woodland communities—dry-mesic upland forests, wet-mesic floodplain forests, and

forested roadsides— showing a preference for disturbed, shaded habitats that are unoccupied by other alien herbs. Invading first along trails, streams, and edges of woods, if unchecked it will develop dense beds that completely dominate the forest floor.

Garlic mustard has several strategies for success. It germinates and grows in early spring, the rosettes remain green during the fall and winter months, and only a small portion of its life span is spent during the summer months when light under the tree canopy is reduced. The plant is also able to self-pollinate; that's how a single plant can populate an entire site. The large number of seeds produced result in dense stands of rosettes and, later, flowering plants that retard the growth of other herbaceous species. These dense stands are also a seed source for new populations.



Garlic mustard identification characteristics; flowering plant, silique (fruit) and seed, flower, and first-year rosette (winter plant).

Illustration courtesy of Illinois Department of Natural Resources

Like other opportunistic plants, garlic mustard is able to grow or reproduce before and after most other plants. It grows during early spring and late fall, when native species are dormant. Early seed germination of garlic mustard occurs when spring leaf expansion is just beginning and no other herbaceous species have germinated or begun spring growth. Although this strategy may result in its exposure to freezing temperatures and snow cover, mortality doesn't appear to increase.

Within 10 years after invasion by garlic mustard, a site's native species richness declines. The native mustard, toothwort, is one of the early casualties. When they compete with garlic mustard, toothwort plants are stunted and yellowed and eventually disappear.

Throughout Illinois, the total area suitable for garlic mustard invasion and growth will certainly expand with increasing human development and disturbance of the landscape.

To Sweat or Not to Sweat?

The goal of any garlic mustard control program is to prevent seed production until the seed bank is exhausted, usually a two to five-year period. The green, overwintering rosettes make it possible to check for the pest's presence all year long. The most effective method of control, with minimal or no side effects to the habitat, is to cut the flowering stems at or within a few inches of the soil surface just as flowering begins. If possible, remove the cut stems from the site. Sounds easy—until you begin. A "few" garlic mustard plants have a way of multiplying before your eyes as sweat courses down your back and the music of mosquitoes rings in your ears.

In nearly pure garlic mustard stands, scything is an option. Scything allows you to cover large areas quickly with minimal soil disturbance. For very large infestations, there are two other methods: burning and herbicides. Fall or early spring burning effectively kills the first-year evergreen plants, provided the fire is of sufficient intensity. Conduct follow-up burns for the next several years to eliminate plants from the seed bank. Conduct spring burns early to minimize damage to native spring wildflowers. Another effective treatment in the spring and fall is to apply 2 percent Round-up to the foliage of individual plants. Round-up is a contact herbicide that will kill any plant it touches, so follow label directions carefully. You can then hand-pull or cut remnant popula-

tions. Unfortunately, there are no easy solutions, and successful control requires a lot of labor and sweat. Once garlic mustard is under control, you can maintain sites by vigilant monitoring and continued hand removal of new plants.

Friend or Foe?

Additional control methods for garlic mustard are being investigated. Biological control agents (either insects or pathogens), different fire regimes, and a summer herbicide treatment are all possibilities.

It is ironic that as new methods of extermination are emerging, the National Cancer Institute is also studying garlic mustard, but for a very different purpose. Garlic mustard contains isothiocyanates, a cancer preventive found in some members of the mustard family, and allyl sulfides, a cancer preventive of the garlic family. In addition, present-day herbals still list garlic mustard as a potherb—an edible fresh green available in the winter and useful as a substitute for garlic or onions in a recipe.

In the long term, garlic mustard may prove to be a boon to humanity, perhaps as a new miracle drug or an important food stuff. For the present, though, it remains a major threat to Illinois woodlands and to the overall plant and animal diversity that resides there.

Susan L. Post is a staff writer for *The Illinois Steward Magazine.*

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Forestry Community Covers Country with Seedlings—*Reforestation is the Lifeblood of Commercial Timberlands.*

In 1993 the forestry community planted about 1.4 billion seedlings on U.S. forestland (Fig. 1). More than 1 million acres—or 43 percent of the total U.S. forestland replanted in 1993—were replanted by the forest products industry. Non-industrial private forest landowners make up the second most active group in reforestation efforts, also replanting more than 1 million acres of new trees in 1993.

A forested area is classified as "forestland" if it is at least 1 acre in size and contains about 10 percent tree cover. In the United States forestlands can be found in every region and state. These forests are extremely diverse, and include species ranging from chaparral to scrub oak to towering Douglas-firs.

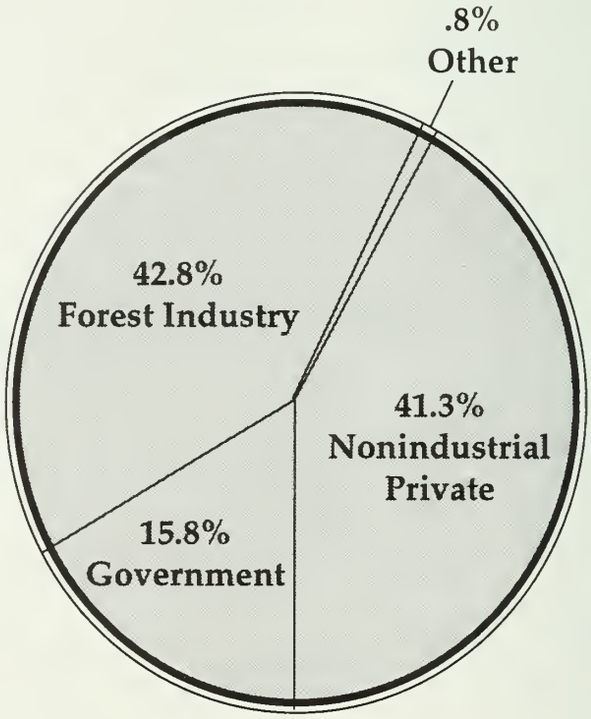


Figure 1. Who Plants America's Trees?

Two-thirds of our forestlands—or some 490 million acres—are classified as "timberland." Timberlands are forests capable of growing 20 cubic feet of commercial wood per year, and are not reserved from harvesting. Some 36 million acres of these forests capable of growing commercial wood are reserved or "set aside" for non-timber uses by specific legislation. These lands are managed by public agencies as parks or wilderness areas.

Currently 57 percent of the growing stock volume on U.S. timberlands is softwoods, the remaining 43 percent is hardwoods (Figs. 3&4). Throughout the years foresters and wood craftspeople have studied the characteristics of these various tree species. From modern research we've learned that location and growth conditions significantly affect the properties of wood.

These variations are carefully considered by those who use wood commercially, especially in the construction industry. Wood from softwood trees is typically used for scaffolding, house framing, sheathing, and paneling.

Hardwoods are mainly used for furniture, flooring, architectural woodwork, trim, paneling, and cabinets. Wood has the following advantages over other building products:

- Trees are a renewable resource. Forest products are also recyclable and biodegradable;
- Most alternative materials come from non-renewable resources—petrochemicals used in plastics and ores used for aluminum and iron;
- The average single-family home (2,000 square feet) can contain 16,900 board feet of lumber and up to 10,000 square feet of panel products;
- Comparing the total energy costs to aquire the raw material, transport, process, and use it—wood far out shines its competitors;
- Aluminum framing uses 126 times as much energy to produce as do wooden wall studs; steel studs require almost nine times more energy.

Who Manages the Woods

The forestry community and federal, state, and local governments must continually work to balance the many competing demands placed on our forestlands. These include timber harvesting, recreation, watershed protection, and wildlife habitat. Altogether, federal, state, and local governments own 131 million of the 490 million acres of commercial timberland in the United States (Fig. 2). A variety of federal and state laws and ad-

Product	Thousands of Acres	Percentage
Publicly Owned	131,493	27%
Federal	96,655	20%
States and Counties	34,840	7%
Privately Owned	358,061	73%
Forest Industry	70,455	14%
Non-industrial	287.606	59%
Total U.S.	489,555	100%

Figure 2. Who Owns America's Productive Timberland?

Figure 3. Tree Species on Unreserved Western Forestland, 1992

Source: Douglas S. Powell, et al.

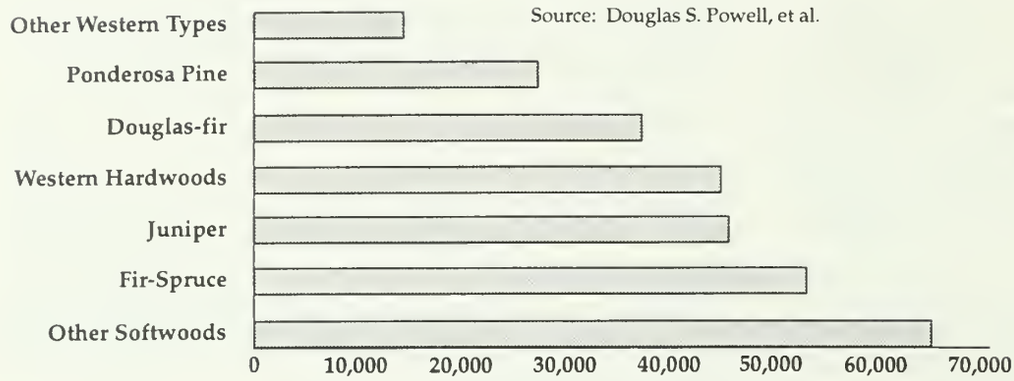


Figure 4. Tree Species on Unreserved Eastern Forestland, 1992

Source: Douglas S. Powell, et al.

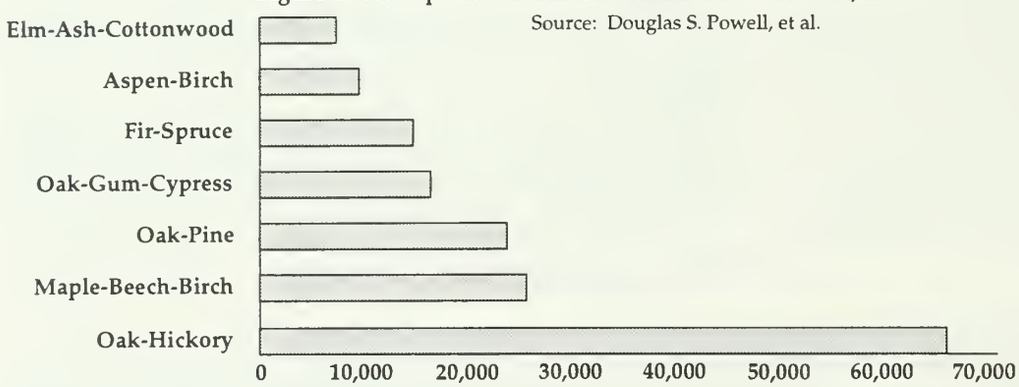


Figure 5. Worldwide Wood Consumption

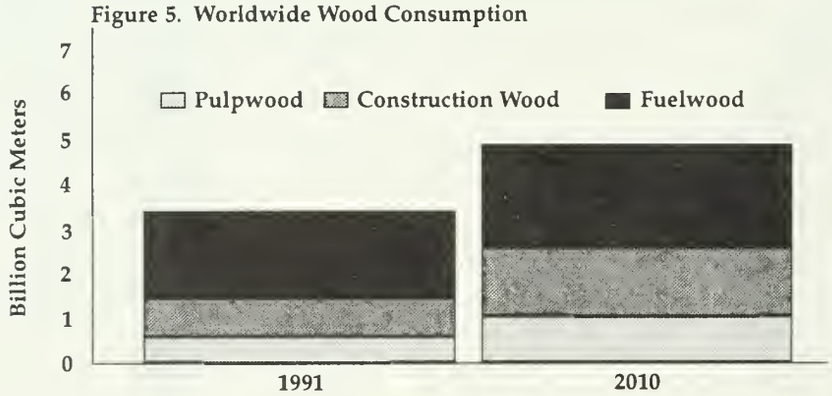
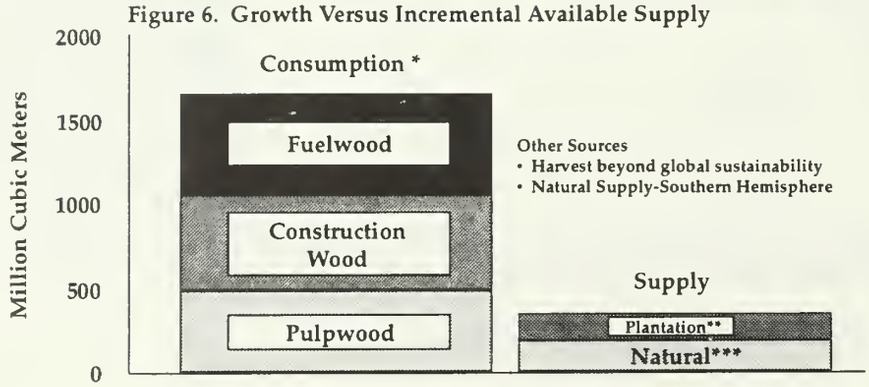


Figure 6. Growth Versus Incremental Available Supply



ministrative decisions govern the management of these lands.

The Forest Service of the U.S. Department of Agriculture manages most federal timberlands, including all national forests. About 85 million acres of U.S. timberlands fall under its tutelage. Those forests provide 12 percent of the total wood volume harvested annually in the United States, including 16 percent of all softwood.

The acreage of about 7 million nonindustrial private owners comprises 59 percent (288 million acres) of the total timberland in the United States. These private lands are predominately in small tracts of forestland. In fact, only about 600,000 landowners have holdings larger than 100 acres.

The forest products industry owns about 70 million acres—or 14 percent—of the most productive commercial timberland in the United States. One-third of the nation's annual timber harvest is drawn from these forests. To ensure the long-term viability of these productive lands, the forest products industry follows sustainable forestry practices that integrate the reforestation, growing, nurturing, and harvesting of trees for wood products.

As of January 1, 1996, the American Forest & Paper Association (AF&PA) is requiring all members to comply with its Sustainable Forestry Initiative. As part of the initiative AF&PA members, on their forests, will:

- Employ an array of scientifically, environmentally, and economically sound practices in the growth, harvest, and use of forests;
- Reforest promptly all harvested areas;

- Protect water quality by using proven forestry methods and EPA-approved Best Management Practices in all forest management operations;
- Enhance wildlife habitat quality by promoting habitat diversity and conservation of plant and animal populations;
- Minimize the visual impact of tree harvests by managing the size of clearcuts;
- Manage company lands of ecologic, geologic, or historical significance in a way that accounts for their special qualities;
- Contribute to biodiversity by enhancing landscape diversity and providing an array of wildlife habitats;
- Continue to improve forestry procedures;
- Continue the prudent use of forest chemicals.

These facts and figures were gathered from U.S. Forest Facts & Figures 1995, *published by the American Forest & Paper Association.*

This article was reprinted from *Tree Farmer Magazine*, September/October, 1995, American Forest Foundation, Washington, DC.

How To Manage Oak Forests For Acorn Production

by Paul S. Johnson, Principal Silviculturist
(from Technical Brief, March 1994, USDA Forest Service)

Importance of Acorns

Oak forests are life support systems for the many animals that live in them. Acorns, a staple product of oak forests, are eaten by many species of birds and mammals including deer, bear, squirrels, mice, rabbits, foxes, raccoons, grackles, turkey, grouse, quail, blue jays, woodpeckers, and water-fowl. The population and health of wildlife often rise and fall with the cyclic production of acorns. Acorns importance to wildlife is related to several factors including their widespread occurrence, palatability, nutritiousness, and availability during the critical fall and winter period. It would seem natural, then, that some oak stands and perhaps extensive forests be managed primarily for acorn production. Even though our knowledge of acorn production is incomplete, we have enough information to make reasoned decisions on the management of oak stands for acorn production.

What We Know About Acorn Production

Acorns of trees in the white oak group (subgenus Lepidobalanus) mature in 3 months; those in the red oak group (subgenus Erythrobalanus) require 15 months (two growing seasons). However, in both species groups, acorn production is relatively unpredictable from year to year. On the average most species produce a good crop of acorns one year in three or four. In years of low or moderate acorn production, most acorns are consumed by insects. Moreover, the production of acorns differs among species. Some species are inherently better acorn producers than others, and different species tend to produce good acorn crops in different years. Although environmental factors unfavorable to acorn production such as late spring frost and summer drought tend to obscure inherent periodicity (cycles) in production, new evidence suggests that such periodicity occurs at 2- 3- and 4-year intervals for black, white, and northern red oaks respectively.

Other factors being equal, trees of large diameter produce more acorns than trees of small diameter. However, in some species, production declines after the tree reaches a threshold diameter (fig. 1). Oaks with crowns fully exposed to light, such as dominant and codominant trees, produce more acorns than trees with crowns totally or partially shaded. In

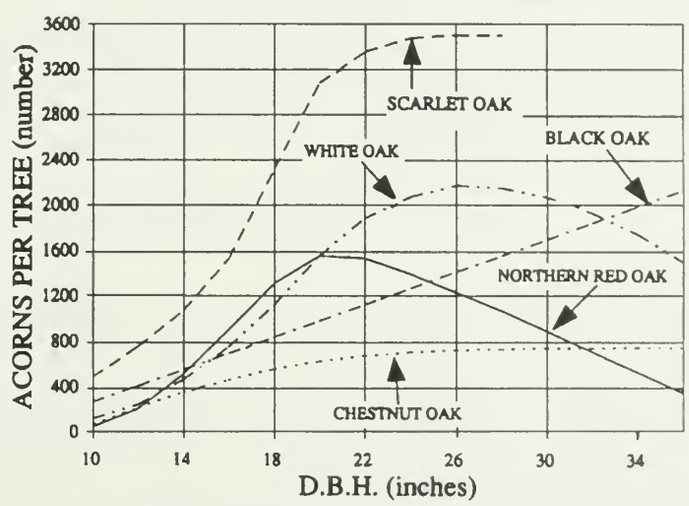


Figure 1. -Average annual acorn production per tree in relation to d.b.h. in the southern Appalachians. (Based on a 7-year study: Downs, 1944.)

the white oak group, when one tree produces well, all of the potential acorn-producing trees in the population tend to produce well. In contrast, in the red oak group, some producers yield well in a given year while others do not. In addition, only a relatively small proportion of trees are inherently good seed producers. For example, among white oaks in Pennsylvania, only 30 percent of large healthy trees produced any acorns even in good seed years and an even smaller proportion produced a good crop in those years.

Management Methods

Substantial gains in acorn production of established stands may be obtained by following these guidelines:

1. Before the first thinning, identify and reserve the good acorn producers in each stand. To do this you'll need to observe and keep records for 5 years or more. If that is impractical, roughly assess the acorn-producing capacity of individual trees by observing production during a single year in which a good to excellent acorn crop occurs for one or more of the major species present. However, in the red oak group, many good producers may be overlooked in a single year because not all trees of those species may produce well in the same year. Criteria for identifying good producers are given in Table 1. The best time to rank trees in the oak-hickory region is from August 10 to 25, before acorn predators begin to eat or cache many acorns. Acorns are best observed with binoculars on bright days when they are silhouetted against the sky.

Table 1. - A ranking of acorn production for individual trees[1]

Ranking	White oak group	Red oak group
	Average number of acorns per bunch[2]	
Excellent	18+	24+
Good	12-17	16-23
Fair	6-11	8-15
Poor	< 5	≤ 8

1 Note that in any one year, excellent producers may not reach their potential because of unfavorable factors.
2 Based on the terminal 24 inches of healthy branches in the upper one-third of the crown.

2. During thinning, retain a mixture of oak species to minimize the impact of the large year-to-year fluctuation in acorn production in any one species.

3. Thin around the identified acorn producers to expose their crowns to full light on all sides. This facilitates crown expansion and increases branch density. Branch density increases acorn production per unit of crown area because of the increase in numbers (density) of acorn-bearing branches. Among the potential acorn producers, dominant and codominant trees will be the most efficient producers. Area-wide thinning is not necessary because only 20 or fewer good seed producers are likely to occur per acre even in pure oak stands. But because these seed producers typically will be dominant and codominont trees, they may account for proportionately more basal area and stocking than their numbers alone indicate.

4. Increase or decrease the rotation (or in uneven-age management, maximum tree diameter) to include the tree diameter of maximum acorn production of the predominant species in each stand. For example, production in northern red oak peaks when tree d.b.h. reaches 20 inches and then it declines in larger trees (Fig. 1). In contrast, white oak production is maximized at about 26 inches. Many other species, however, do not exhibit well-defined diameter-related peaks in production at least within the diameter ranges that have been reported. Large senescent trees are usually poor acorn producers.

Reprinted from: *The Woodland Steward Newsletter*, Spring 1995, Volume 4, Number 1, Butlerville, IN.

Tax Tips for Forest Landowners for the 1995 Tax Year

by Larry M. Bishop, Forest Management
and Taxation Specialist, USDA Forest Service

After much talk about tax reform in 1995, no major tax legislation has passed Congress—yet. Time is running out for the 1995 tax year. Any proposed changes in the capital gains rate will probably not go into effect until 1996. Assuming that most new tax legislation, when it does happen, will not be retroactive, then the number of ordinary tax brackets for

1995 will remain the same as in 1994. Those five brackets are: 15, 28, 33, 36, and 39.6 percent. Likewise, long-term capital gains will remain the same as in 1994, i.e., they will continue to be taxed at the ordinary rate, not to exceed 28 percent. This, plus the information that follows, are some things to keep in mind when you prepare your 1995 Federal income tax return. This information is current as of December 13, 1995 and supercedes Management Bulletin R8-MB 73.

Passive Loss Rules

The real enigma for forest landowners continues to be the passive loss rules. This subject is much too complicated to go into detail here, but what follows is a very brief summary. Under the passive loss rules, you can be classified in one of three categories: (1) investor, (2) passive participant in a trade or business, or (3) active participant (materially participating) in a trade or business. You will probably want to be in the last category because all management expenses, property taxes, and interest on trade or business indebtedness is fully deductible each year as incurred from income from any source.

The law's intent is that you are "materially participating" if your involvement is regular, continuous, and substantial; however, a low level of activity is adequate if that level is all that is required to sustain the trade or business. This means that record keeping is very important! To show material participation, landowners will certainly need to keep records of all business transactions related to managing their timber stands. Likewise, it would be a good idea to keep records of other business-related activities such as landowner meetings attended, odometer readings to and from meetings, cancelled checks for registration fees, and copies of meeting agendas. Generally, you are likely to benefit most from being actively involved (materially participating) in the management of your timber lands. On the other hand, if you have considerable passive income (such as Conservation Reserve Program annual rental payments), it may be to your advantage to be considered "passive." Most of the discussion which follows applies to forest landowners who are "materially participating."

Reforestation Tax Credit and Amortization

The reforestation tax credit and 7-year amortization continues to be one of the best tax advantages for forest landowners. Therefore, if you reforest during 1995, you can claim a 10-percent investment tax credit for the first $10,000 you spent for reforestation during the tax year. In addition, you can amortize (deduct) 95 percent of your 1995 reforestation cost (up to $10,000) over the next 7 years (actually 8 tax years). The election to amortize must be made on a timely tax return for the year in which the reforestation expenses were incurred. (Passive owners may or may not be eligible for the amortization and credit).

Here's how it works. Assume you spent $10,000 to reforest a cutover tract in 1995. You claim a $1,000 tax credit (10 percent of $10,000) for 1995. You can also deduct 95 percent of these reforestation costs over the next 8 tax years. Due to a half-year convention you can only claim one-half of the annual amortizable portion for 1995. This means that on your 1995 tax return you can deduct one-half of (.95 x $10,000 divided by 7) or $679.00. For the next 6 tax years you can deduct (.95 x $10,000 divided by 7) or $1,357.00, and the remaining $679.00 can be deducted the eighth tax year.

The annual reforestation amortization is a deduction to adjusted gross income. It can be claimed on Form 1040 on the line for adjustments rather than being claimed on Schedule A under miscellaneous deductions. (If you use Schedule A for this purpose, you can claim only aggragated miscellaneous deductions that exceed 2 percent of adjusted gross income). Use Form 3468 to claim the investment tax credit.

Any reforestation costs exceeding the $10,000 annual limit should be capitalized (entered into your timber account). You can recover (deduct) these costs when you sell your timber.

A final word of caution: The tax credit and 7-year amortization deductions are subject to recapture if you dispose of your trees within 5 years of planting for the credit, and within 10 years of planting for the amortization.

Capital Gains

If you report your timber sale income as ordinary income, you could pay significantly more in taxes than you would if you report it as a capital gain. For 1995, noncorporate capital gains are taxed at the ordinary tax rate, not to exceed 28 percent. Also, capital gains are not subject to the self-employment tax, as is ordinary income. The net self-employment taxt rate for 1995 is 15.3 percent for self-employment income of $400 or more. The rate consists of a 12.4 percent component for old age, survivors and disability insurance

(OASDI) and a 2.9 percent component for hospital insurance (Medicare). The maximum income subject to the OASDI component of the tax rate is $61,200, while the Medicare component is unlimited. However, if wages subject to Social Security or Railroad Retirement tax are received during the tax year, the maximum is reduced by the amount of wages on which these taxes were paid.

Cost-share Payments

Did you receive cost-share assistance under one or more of the Federal or State cost-share programs during 1995? If so, you may have to report some or all of it as ordinary income. You have several options. You have the option to include it as income and then recover the part that you pay plus the cost-share payment through the amortization and reforestation tax credit already described. You also have the option to exclude the "excludable portion" from income if certain conditions are met. These conditions are: (1) the cost-share program has to be approved for exclusion by the Secretaries of Agriculture and Treasury and; (2) the maximum amount excludable per acre is the greater of: (a) the present value of $2.50 per acre or, (b) the present value of 10 percent of the average income per acre for the past 3 tax years. This second requirement gets rather complicated because you have to determine an appropriate interst rate to compute the present values.

Generally though, if you harvested the tract within the last 3 years, probably all of the cost-shares received can be excluded from income. In some cases, taxpayers may be better off to exclude cost-share payments. Other taxpayers may be better of not to exclude cost-share payments as part of the reforestation tax credit/7-year amortization. The important point here is: You must report cost-share payments. If you decide to exclude, attach a statement to your return that states specifically what cost-share payments you received and that you choose to exclude some or all of them, and how you determined the excludable amount.

NOTE: All or part of the cost-share payments received under the Federal Stewardship Incentive Program (SIP) may now be excluded from your gross income. The Internal Revenue Service (IRS) issued this decision on April 11, 1994, as Revenue Ruling 94-27.

Conservation Reserve Program

If you planted trees during 1995 under the Conservation Reserve Program (CRP), you must report your annual payments as ordinary income. If you received CRP cost-share assistance funds for planting your trees, you must also report these as ordinary income. CRP cost-share payments, unlike the other cost-share payments already discussed, cannot be excluded from income. CRP cost-share payments, however, can be claimed as part of the reforestation expenses reported for the reforestation tax credit/7-year amortization.

Farmers may treat expenditures for soil and water conservation on farmland as expenses in the year incurred, rather than capitalizing them (CRP expenditures qualify). However, the amount deductible in any year shall not exceed 25 percent of the gross income from farming.

Casualty Losses

A casualty loss must result from some event that is: (1) identifiable, (2) damaging to property, and (3) sudden, and unexpected or unusual in nature. Examples include wildfire and storms. In most cases, your claim for casualty losses can be no more than the adjusted basis less any insurance or other compensation.

In 1987, the IRS issued position statements on southern pine beetle losses in timber stands and drought losses of planted seedlings. In both cases, the IRS stated that, generally, neither circumstance qualified for casualty-loss deductions because they failed to meet the suddenness standard. It may be possible, however, to take a business-or investment-loss deduction for both types of damage.

In 1990, the IRS modified its position on losses due to drought. In Revenue Ruling 90-61, the IRS held that a non-casualty loss is available in business or investment situations when abnormal drought causes the death of tree seedlings. This type of loss is considered an "involuntary conversion".

Management and Maintenance Expenses

Generally, your annual expenses for the managment and maintenance of an existing stand of timber can be expensed or capitalized. In most cases, you are better off to expense those costs during the tax year they are incurred, rather than capitalizing them. If it is not to your advantage to itemize deductions for 1995, you should capitalize these expenses. If you choose to itemize deductions, you can deduct these

expenses, but the passive loss rules apply.

Conclusion

Remember these points when you file your 1995 Federal income taxes:

1. Decide if you are going to be an active or passive participant. Generally, you will get a better tax advantage if you are active.

2. Keep good records! This includes receipts for business transactions, diaries, and landowner meeting agendas.

3. If you had reforestation (timber stand establishment) costs, be sure to consider the 10-percent reforestation tax credit/7-year amortization.

4. If you sold timber during 1995, you may be able to benefit from the long-term capital gains provision because you do not have to pay self-employment tax on capital gains.

5. If you had cost-share assistance during 1995, you must report it to the IRS. You may choose to exclude some or all of it, if certain qualifications are met, but you still must report it.

6. If you participated in the Conservation Reserve Program, your annual payments must be reported as ordinary income. Likewise, if you received CRP cost-share assistance funds, you must report them as ordinary income.

7. Get help for forest management planning and for tax planning. Proper tax planning is just as important as the management techniques to grow a profitable timber crop. For help, contact a professional tax advisor, the Cooperative Extension Service, or your State forestry agency.

Reprinted from: USDA Forest Service-Cooperative Forestry Management Bulletin R8-MB 74, December 1995.

NEW TAX PUBLICATION AVAILABLE

The new *Forest Owners' Guide to the Federal Income Tax,* USDA Forest Service Agricultural Handbook No. 708 is now available from the U.S. Superintendent of Documents, Government Printing Office (GOP). The cost is $10.00, which includes shipping and handling. The publication can be ordered by phone with MasterCard or Visa by calling the GOP Service Center at 202/512-1800. When ordering, refer to the publication's GPO number: 001-000-04621-7.

WHAT'S AILING YOUR ASH TREES?

by Jill D. Pokorny, Plant Pathologist, Forest Health Protection, S&PF, USDA Forest Service

It could be a recently discovered disease called ash yellows. Ash yellows, a disease caused by mycoplasmalike organisms (MLOs), inhibits growth and causes decline of ash (Fraxinus) species. Although this disease may have been present in the northeastern USA since the 1930s, it was not described apart from the broader problem of ash decline caused by environmental factors until the 1980s. This article will provide practical information about ash yellows, its relationship to premature decline in ash species, how to identify symptoms, and outline management prescriptions for rural and urban forests.

PREMATURE DECLINE OF ASH: A HISTORICAL PERSPECTIVE

Since the 1930s, an unexplained progressive decline of white ash, and to a lesser extent green and black ash, has been observed in the northeastern United States. This decline syndrome is commonly referred to as ash decline. Ash trees of all age classes in forest, hedgerow, roadside and home landscape sites are affected and commonly die 2-10 years after the onset of symptoms. Early studies linked ash decline to adverse environmental factors such as drought, shallow soils, flooding, or parasitism by opportunistic fungi. It was not until the 1980s that a distinct disease, ash yellows, was discovered to be frequently associated with ash trees exhibiting symptoms of slow growth and branch dieback.

To date, no single factor has been proven to be the cause of

ash decline. Ash yellows and environmental stressors may, in fact, be co-conspirators in the development of ash decline. Field studies demonstrate that ash yellows is often detected on sites where environmental stressors such as water shortage, competition with neighboring trees or insect damage are present. In a recent survey of 4 midwestern states, widespread growth reduction and crown dieback observed in green ash forest stands was found to be independent of MLO (ash yellows) infection. The region-wide drought in 1980 and 1981 and the moderate to extreme drought in 1988 and 1989 may have been the cause of the reported decline in the Midwest. More recently in the Midwest, crown dieback has been reported in green and white ash, following the severe cold winter temperatures of 1994. Clearly, current knowledge supports the theory that ash decline can result from various causes, and that ash yellows can be, but is not always, a causal factor.

The impact of ash yellows on ash populations is not well documented. Individual infected trees are likely to show declining radial and apical growth and, often, dieback. The disease occurs in woodlots and forests, home landscapes, and urban plantings.

Ash species play a significant role in the ecology of rural and urban northeastern forests. Their decline could have a serious impact on the health of aquatic and terrestrial plant and animal communities. Native green ash, found along streams and lakes, floodplains and in riparian corridors, provides nesting sites and roosts for several species of birds and other wildlife. White ash occurs mainly on upland slopes and ravines. Black ash usually occurs along rivers and small streams, and on the edges of bogs. Many insects and fish thrive in the cool water temperatures maintained by the shade of stream-side ash trees. In the urban setting, green and white ash are in high demand for landscaping and reforestation efforts. Their decline will result in reduced property values and wildlife habitats, coupled with large expenditures in community tree planting and maintenance programs.

The ashes represent a valuable hardwood resource, with an estimated 275 million board feet of ash lumber sawn annually. In the northeastern USA, approximately 33% of the commercial forest area has ash as a component, with green and white ash being the most important ash species. Black ash is an important timber species and is highly prized by Native Americans for use in basketmaking. Ash wood, tough and resistant to shock, is used for handles, oars, baseball bats and furniture.

To help clarify the incidence of ash yellows in the urban forests of the upper Midwest, the Forest Service is funding a two year project to survey green ash trees in nine Iowa and Wisconsin communities. The project is a cooperative effort with Iowa State University, and the Iowa and Wisconsin Departments of Natural Resources, municipal and state foresters and county conservation districts in the communities surveyed. The results of this survey will help to assess the magnitude of the ash yellows threat to urban areas in the upper Midwest. The project also sponsors educational workshops for urban foresters that provide information on recognizing field symptoms and management options. According to Mark Gleason, project coordinator from Iowa Sate University, "the level of cooperation between agencies has been exemplary."

THE DISEASE CYCLE

Ash yellows is caused by wall-less microbes called mycoplasmalike organisms (MLOs) which invade the tree's vascular system (phloem sieve tubes). Little else is known about the disease cycle of ash yellows. The causal MLOs are presumed to be spread by insect vectors such as leafhoppers, because these insects are the most common vectors of MLOs causing other plant diseases. Symptoms develop 0-3 years after MLOs are detected in ash phloem.

DISTRIBUTION AND HOST RANGE

Ash yellows has been reported only in North America. The main range of the disease includes parts of 16 northeastern and Midwestern states and the southernmost portions of the Canadian provinces of Ontario and Quebec (Figure 1). Ash yellows has also been found in two southwestern locations. In addition to white ash *(F. americana)* and green ash *(F. pennsylvanica)*, ten other ash species including blue ash *(F. quadrangulata)*, black ash *(F. nigra)*, and velvet ash *(F. velutina)* are also reported hosts.

SYMPTOMS

Symptoms of ash yellows vary with species. White ash sustains permanent and often rapid decline in apical and radial growth. Slow twig growth and short internodes can cause foliage to appear tufted at the tips of twigs and the crown to

Figure 1. Known distribution of ash yellows, 1994.

appear thin and sparse. Small leaf size and light green leaf color, upturned leaf margins, and premature fall coloration are common. Abnormal branching may also occur. Witches'-brooms, clusters of upright spindly shoots, may develop. Witches'-brooms form most often on trees with severe dieback, usually at the root collar but sometimes on the trunk, and commonly at basal injuries made by mechanical equipment or frost. Green ash exhibit symptoms similar to white ash but often appear to sustain less dieback and sometimes produce witches'-brooms without other distinctive symptoms.

DIAGNOSIS

Field diagnosis of ash yellows can be difficult. Reduced growth, abnormal branching, and progressive decline are typical symptoms but can be caused by other factors such as poor site conditions, drought stress, freezing and flooding damage, mechanical or chemical injuries, insect attack, and parasitism by opportunistic fungi. Witches'-brooms are diagnostic, but only a small percentage of infected trees display this symptom at a given time.

To assess a stand for the presence of ash yellows, inspect suppressed saplings and stumps, particularly along the edges of the stand, for the witches'-brooms. If ash yellows is present, careful inspection will usually reveal at least one tree or stump with a broom. If brooms are found, then trees showing abnormal branching may be assumed to have ash yellows.

LABORATORY

A standard microscopic test is available to detect MLOs in ash phloem tissue. Microscopic testing is required for diagnosis of the disease in most individual or landscape trees, but careful field survey is nearly as effective as microscopic testing for detection of the disease in a stand or woodlot.

MANAGEMENT

There is no known way to prevent or cure ash yellows. White ash that becomes infected when young do not grow to merchantable size. Most merchantable-sized diseased ash trees live for at least 5-10 years. Management prescriptions that promote species diversity and reduce plant stresses from water shortage and competition should minimize growth losses associated with ash yellows.

FORESTS

Management of stands where ash yellows occurs should be aimed at gradual replacement of white ash with other species. Where ash yellows occurs in merchantable white ash stands, trees of this species that exhibit slow growth and dieback should be removed during regular harvests as follows:

- Harvest trees with greater than 50% crown dieback within 5 years.
- Remove other affected ash during subsequent harvests.

HOME LANDSCAPES

Managers of shade and ornamental trees should consider management strategies which:

- Remove trees with severe dieback because they cannot be rehabilitated.
- Promote species diversity in tree planting programs and avoid monocultures of ash along city streets.
- Select tree species suitable to planting sites and avoid planting ash in drought-prone sites.
- Encourage tree care practices that reduce plant stresses. Watering during drought and periodic fertilizatian to promote general tree health may be useful.

In the future, ash cultivars or rootstocks resistant to or tolerant of ash yellows may become available.

The U.S. Forest Service has published a new informational brochure entitled, "How to Identify and Manage Ash Yel-

lows in Forest Stands and Home Landscapes. This color guide illustrates symptoms of ash yellows and provides forest managers and landowners with management prescriptions to minimize losses associated with ash yellows and preserve the resource. For a free copy, write or fax: USDA Forest Service, State and Private Forestry, 1992 Folwell Avenue, St. Paul, MN 55108; phone: (612) 649-5262; fax: (612) 649-5238.

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ILLINOIS TIMBER PRICES

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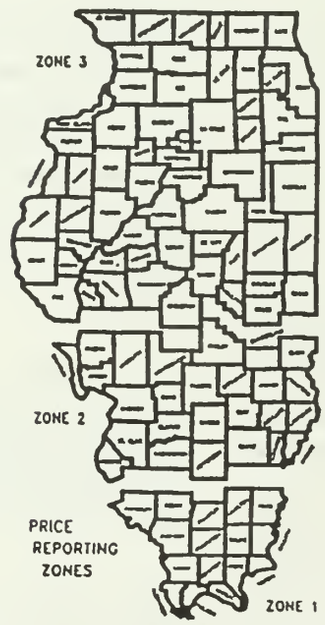
November 22, 1995



PRICES PAID ILLINOIS TIMBER PRODUCERS
MAY 1995 THROUGH AUGUST 1995

Summer sawtimber prices paid to Illinois timber growers showed no clear upward or downward trend for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1995 operations, 50% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Conservation, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	May 1994-August 1994		November 1994-February 1995		May 1995-August 1995	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	170	315	160	280	180	330
Basswood	130	240	100	220	100	190
Beech	50	170	70	160	70	160
Cottonwood	50	155	45	140	50	140
Sweet Gum	60	165	75	155	60	150
Elm & Hackberry	60	165	75	160	60	150
Hickory	70	185	70	175	80	170
Soft Maple	80	175	85	195	80	200
Sugar Maple	120	255	110	225	120	250
Black Oak	145	250	130	265	150	320
Pin Oak	75	160	75	165	70	160
Red Oak	215	365	245	400	220	390
White Oak	200	310	195	335	220	380
Yellow Poplar	140	285	100	240	120	230
Sycamore	60	155	60	175	60	160
Black Walnut	345	545	300	545	380	540
Woods Run Bottomland	80	170	75	160	80	190
Woods Run Upland	120	200	120	200	130	300

FACE VENEER - $ PER M BD. FT.

Red Oak	610	1,100	700	870	570	940
White Oak	980	1,800	920	1,680	940	1,550
Walnut	1,700	2,300	1,600	2,090	1,420	1,990

COOPERAGE - $ PER M BD. FT.

White Oak	220	400	190	400	250	420

Timber Prices
May 1995-August 1995
November 22, 1995

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
May 1995 - August 1995

PRODUCT	UNIT	Zone 1 Stumpage	Zone 1 F.O.B. Mill	Zone 2 Stumpage	Zone 2 F.O.B. Mill	Zone 3 Stumpage	Zone 3 F.O.B. Mill
				Dollars			
1. Sawtimber							
Ash	M bd. ft.	100 - 200	300 - 450	100 - 350	200 - 450	100 - 250	150 - 300
Basswood	M bd. ft.	60 - 100	200 - 250	20 - 230	100 - 300	30 - 200	130 - 250
Beech	M bd. ft.	20 - 100	140 - 200	80 - 120	100 - 180	50 - 100	100 - 180
Cottonwood	M bd. ft.	20 - 60	140 - 180	30 - 80	100 - 180	20 - 50	100 - 160
Sweet Gum	M bd. ft.	30 - 100	140 - 200	40 - 100	100 - 160	50 - 100	130 - 180
Elm & Hackberry	M bd. ft.	20 - 80	140 - 200	20 - 100	100 - 180	30 - 100	130 - 200
Hickory	M bd. ft.	40 - 100	150 - 250	20 - 160	120 - 200	30 - 150	100 - 200
Soft Maple	M bd. ft.	30 - 80	150 - 200	30 - 150	100 - 300	80 - 150	130 - 280
Sugar Maple	M bd. ft.	40 - 150	150 - 300	60 - 200	150 - 300	100 - 200	250 - 350
Black Oak	M bd. ft.	100 - 200	250 - 450	100 - 300	200 - 550	20 - 250	220 - 400
Pin Oak	M bd. ft.	30 - 110	140 - 200	30 - 120	100 - 200	20 - 150	130 - 200
Red Oak	M bd. ft.	110 - 350	200 - 500	60 - 400	200 - 550	70 - 400	200 - 460
White Oak	M bd. ft.	100 - 300	300 - 450	60 - 350	280 - 550	70 - 450	250 - 400
Yellow Poplar	M bd. ft.	90 - 160	140 - 300	120 - 180	150 - 350	80 200	180 - 300
Sycamore	M bd. ft.	20 - 60	140 - 200	50 - 80	100 - 200	30 - 80	100 - 200
Black Walnut	M bd. ft.	200 - 400	400 - 650	200 - 500	380 - 650	200 - 600	500 - 700
Woods Run Bottomland	M bd. ft.	50 - 100	150 - 230	50 - 120	140 - 250	50 - 100	180 - 200
Woods Run Upland	M bd. ft.	100 - 300	150 - 450	50 - 300	140 - 450	50 - 200	180 - 400

		STATEWIDE Stumpage	STATEWIDE F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	300 - 1,250	400 - 1,400
White Oak	M bd. ft.	200 - 1,500	900 - 2,220
Walnut	M bd. ft.	500 - 3,000	1,000 - 3,500
3. Cooperage			
White Oak	M bd. ft.	150 - 300	350 - 450
4. Pulpwood			
Unpeeled	Ton	1.75 - 2.25	16.75 - 20.00

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	97
Scribner	3
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	2	100 - 200
Zone 2	3	100 - 200
Zone 3	5	110 - 300
ILLINOIS	10	100 - 300

VOLUME OF 1995 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	15	7	60	22
100 - 500	15	33	26	28
500 - 1.000	31	20	-	17
1,000 - 3,000	8	20	7	14
3,000 +	31	20	7	19

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - MAY 1995 - AUGUST 1995

	STATEWIDE STUMPAGE*
Woods Run Upland	$166-$635/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

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Karen Colbert

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Natural Resources and Environmental Sciences and the Cooperative Extension Service. Our newsletter features information from many sources to help you make informed decisions concerning your woodland resources. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave. Urbana, IL 61801.

The Illinois Pro Logger Training Program

by Mike Bolin Extension Forester & Training Coordinator

As the sun begins to break on this crisp March morning sending brilliant hues of red, pink and orange dancing off wispy clouds hovering close to the horizon, the sounds of chain saws and heavy equipment break the woodland's sleepy silence. A fox squirrel pokes its head from its rustic condo door high atop a decadent, old basswood tree and answers the racket with incessant chatter as if to say, "enough already". A family of downy woodpeckers residing in the same den tree flee their residence at the sound of impending danger. Their flight is well founded for the sound of a chain saw always has been synonymous with danger not only for the forest and its residents, but likewise for loggers themselves. However, there is a new program afoot in Illinois that is designed to lessen the inherent risks involved in logging and to help minimize the disruptive effects logging has on the forest.

The program, known as the Illinois Pro Logger Training Program, is designed to improve safety, efficiency and productivity within Illinois' logging industry while instilling an understanding of best management practices that can be employed during harvesting to lessen logging's impact on the environment. Initiated in 1995, the training was developed as a joint effort between the Illinois Council on Forestry Development, the Illinois Wood Products Association, the Illinois Cooperative Extension Service, the Illinois Department of Natural Resources, and the forestry schools at the University of Illinois and Southern Illinois

The 1996 northern Illinois class (top), and the 1996 western Illinois class (bottom).

University. Initial training sites were located in southern, western, and northern Illinois. To date, 41 loggers have completed the intensive training course.

The Way We Were.

In the United States, logging has been predominately a family legacy passed down from generation to generation, father teaching son. The cutting methods, practices and personal beliefs and ethics, good or bad, passed in this traditional way, as well. Today, environmental awareness of the public and private forest landowners is greater than any time in history. Both place greater emphasis on ecological, recreational, and aesthetic values than on timber production, and their opinions influence land-use laws and regulation (Jones 1996). In numerous states this influence has brought logging to a standstill and has caused great stress and displacement for many families who have relied on logging for their livelihood. Until recently, little has been done to help professional loggers go about their business in a different way that address the environmental and aesthetic concerns of private landowners and the public and the regulations imposed on the logging industry by government.

The 1996 southern Illinois class (top); the 1995 southern Illinois class (bottom).

Safety First!

Logging is one of the most hazardous professions worldwide. However, the United States lags behind in the training of its logging force. Safety, productivity, and environmental stewardship training, which have helped build professionalism and pubic recognition of the logging profession, have long been the rule in Europe and Scandinavia.

It is difficult to build safe harvesting skills or an environmental stewardship ethic if the logger is dead. For some who abhor the cutting of any tree, a dead logger might not raise any level of concern. However, in 1994, there were over 44,000 chain saw-related injuries. Many of these injuries can be traced to homeowner and "weekend warrior" encounters, but it is safe to say that many professional loggers also end up on the "business end" of the chain saw by mistake. "In 1991, the rate of work-related injuries in the US logging industry was twice the average rate for all industries in the national private sector economy. Although logging accounts for only about 0.4 percent of the manufacturing employment in the United States, it accounted for approximately 20 percent of all deaths in manufacturing work between 1980 and 1988 (an annual average of 161 deaths per 100,000 full-time workers). The total private sector rate was only 7 deaths per 100,000 full-time workers (Myers and Fosbroke 1994)" (Egan 1996). "In 1993, 147 logging industry workers died as a result of work-related injuries (US Department of Labor, 1995a). There were also 13,800 nonfatal injuries—5,875 resulting in time away from work (US Department of Labor 1995b, 1995c)" (Fosbroke and Myers 1996). In Illinois, we have averaged one death per year over the last 5 years in our logger work force.

Directional felling begins with lining up the notch face direction.

Safety is a major component of the Illinois Pro Logger Training Program. Graduates of Illinois' training program receive 5 days of intensive, "hands-on" training and individual instruction. Loggers spend four of the five days participating in Soren Erikkson's *Game of Logging* program. Erikkson is regarded as one of the world's leading logging safety and efficiency experts. In the *Game of Logging* program, loggers learn the fundamentals of saw handling and control, systematic chain saw maintenance to reduce down time and injury, and how to maximize productivity and equipment performance. The training also addresses the new OSHA standards for logging and what logging companies and crews must do comply with these standards. The importance of using personal protection equipment (PPE), such as a hard hat, eye and ear protection, cut-resistant chaps or pants and boots, and gloves, is stressed (and required of all participants) in the training.

The Importance of a Plan.

Paramount in the training is the need for a well thought out plan of how the tree will be harvested before the chain saw starts. Five elements are critical in the harvest plan. The loggers must identify all hazards that surround their work area. This applies not only to the tree that will be felled, but surrounding trees, as well. Falling objects account for most of the deaths and debilitating injuries to loggers and skidder operators. These occurrences are referred to as "struck byes" in the trade. A common term used is "widow maker", which often refers to a dead limb or hanging limb that could dislodge and fall as the tree begins to fall. Frequently, limbs will be thrown back at the logger as the felled tree brushes against the tops of nearby standing trees. Most people think of loggers being killed or severely injured by the tree falling on them. In reality, being struck by a falling tree accounts for only a minor percentage of logging deaths or serious injuries. And those that do occur are most likely the result of poor felling techniques.

The harvest plan also includes; an assessment of any side or back lean the tree might have, which determines its good and bad side to work from; the planned route of retreat after the tree begins to fall; what hinge size will be nec-

essary for the tree in question; and an explanation of how the tree will be cut.

Directional Felling.

Much of the training time is spent learning new techniques that allow the loggers to fell trees with much greater precision. By mastering the techniques of directional felling, the loggers will be able to place trees exactly where they want them to fall. This will markedly reduce damage to the residual trees in the forest and thus will improve the value of future crop trees. It will also free up the need for the skidder to be present when trees are being felled. In many logging operations, the skidder is used to help steer the tree to the ground. The training helps point out how inefficient and expensive this practice is and how the same result can be achieved with a couple plastic wedges.

The first cut made in the open face notch is the down-cut. For small to medium-sized trees, this cut is nearly vertical.

Key to mastering directional felling is learning how to make an open-faced notch and setting up the proper hinge size for the specific tree. The open-face notch has an opening of 70 degrees or more. This allows the tree to fall completely to the ground before the notch closes. A traditional notch with an opening of 30 to 45 degrees will close before the tree hits the ground. This will cause fiber pull within the butt log of the tree, which degrades its value considerably.

The second cut is easily made by looking into the down-cut. The base-cut and down-cut should match with less than one-quarter inch by-pass. The angle opening should be 70 degrees or more.

The hinge serves the same principle as the hinge on a door. The hinge supports and guides the tree as it falls. The length and thickness of the hinge is dependent on the size and species of tree. The strength of even a one-half inch thick hinge is amazing, and it is remarkable to watch how the combination of the open-faced notch and hinge accurately guides the tree to any place a logger, trained in their use, wants to put it.

Once the tree is on the ground, proper procedures for limbing and bucking are also stressed since this is where many chain saw-related injuries occur. Frequently, a harvested trees will bend over and pin smaller trees and saplings to the ground. The violent pressure that is released

when these pinned trees or "springpoles" are cut loose or become dislodged when the felled tree is bucked up is enough to kill or permanently cripple an unsuspecting logger if they happen to be standing in the springpole's path.

Competition Enhances Learning

The *Game of Logging* utilizes a teaching method known as "competitive response training (CRT)", which allows each logger to measure and compare his/her level of understanding and use of the techniques taught to other loggers in the class. Points are applied to the information and techniques taught by the instructor. Each logger is given the opportunity to demonstrate before the class his/her understanding of the information and techniques, and they are evaluated by the instructor and by the class participants. Points are awarded for providing correct answers to questions asked by the instructor and for correct skills used in felling, limbing and bucking the tree. Points are deducted for any safety violations that occur during the felling, limbing, or bucking process. At the end of each training day, prizes are awarded based on the loggers' scores. The first logger to earn a per-

The hinge is set up by making a bore cut into the trunk with the bottom edge of the bar tip. The bore cut should start on the bad side of the tree (side to which the tree leans) and finish on the tree's good side. If the bar cannot reach completely through the tree, the cut should be made in two steps. It is unsafe to bore (cut) more than half-way through the tree from the bad side.

The open face notch allows the tree to fall completely to the ground before the notch closes. This is not the case with common notches of 30-45 degrees. When the notch closes before the tree is on the ground, this causes fiber pull, which degrades the quality of the butt log.

Each logger's technique is critiqued by the *Game of Logging* instructor and by the class.

fect score wins a new chain saw provided by Husqvarna Forest and Garden Company, a corporate sponsor of the *Game of Logging*.

The training's competitive response format has proven superior in its ability to produce much higher retention of information and learned skills and techniques to the standard demonstration technique, which is utilized in many training programs.

Logging and Responsible Stewardship

The fifth day of training concentrates on developing the loggers' understanding of forest ecology, silviculture, and best management practices that help reduce soil erosion, maintain water quality, and minimize impact on the residual forest. Most loggers have worked in the woods all their lives and harvesting trees is what they know best. However, understanding the implications of harvesting trees and how to minimize logging's impact on the forest and riparian areas both during and after harvesting may be less familiar to them. These points are the main focus of the fifth day of Illinois' training program. Instructors concentrate on how trees and forests grow and develop, and how harvesting can be beneficial or detrimental to the health and vigor of the residual forest. Field trips to sites to see and discuss examples of good and bad harvesting techniques are employed. Techniques to minimize soil erosion and water quality problems on skid trails, log landings, and haul roads as well as damage to remaining trees are also discussed.

Putting Learned Skills to the Test

Loggers graduating from the Illinois Pro Logger Training Program have the opportunity to participate in the Illinois *Game of Logging* Regional competition, which is held at the DuQuoin State Fair. The competitive events are based on the techniques, skills, and information the loggers learned during the training. The general public is welcome and encouraged to watch the loggers compete. Throughout the competition, a commentator explains to the audience what the loggers are doing and how the specific skill relates to what they do on the job each day. The competition provides an excellent opportunity for the public to learn more about Illinois' logging industry and the many skills it takes to be a trained, professional logger.

Loggers completing Illinois' training program are eligible to compete in the Illinois Regional *Game of Logging* competion with the winner qualifying for the National Finals in Ohio.

The 1995 Game of Logging National Finalists. Illinois' representative, Odell Williams from Karnak, is pictured fourth from the right in the second row.

The loggers compete for cash and prize awards totaling over $3,000. The winner receives a check for $1000, a new Husqvarna chain saw, a complete outfit of personal protection equipment, and earns the right to represent Illinois at the National *Game of Logging* Finals held each October in Ohio. The national finalists compete in the same events as the regional competitors, but are vying for a $10,000 first prize.

There is a change happening in Illinois' forests. It is a change that will not be apparent over night, but with perseverance it will be a change that will yield a safer, more productive logging profession, and a change that allows our forests to continue to provide a sustainable supply of wood and fiber to meet society's ever-increasing demand, and in the interim between harvests a place of beauty and heritage for future generations to enjoy.

If you would like to receive a list of loggers who have completed the Illinois Pro Logger Training Program, please write and request this list from: Extension Forester, W-503 Turner Hall, 1102 S. Goodwin Ave., Urbana, IL 61801.

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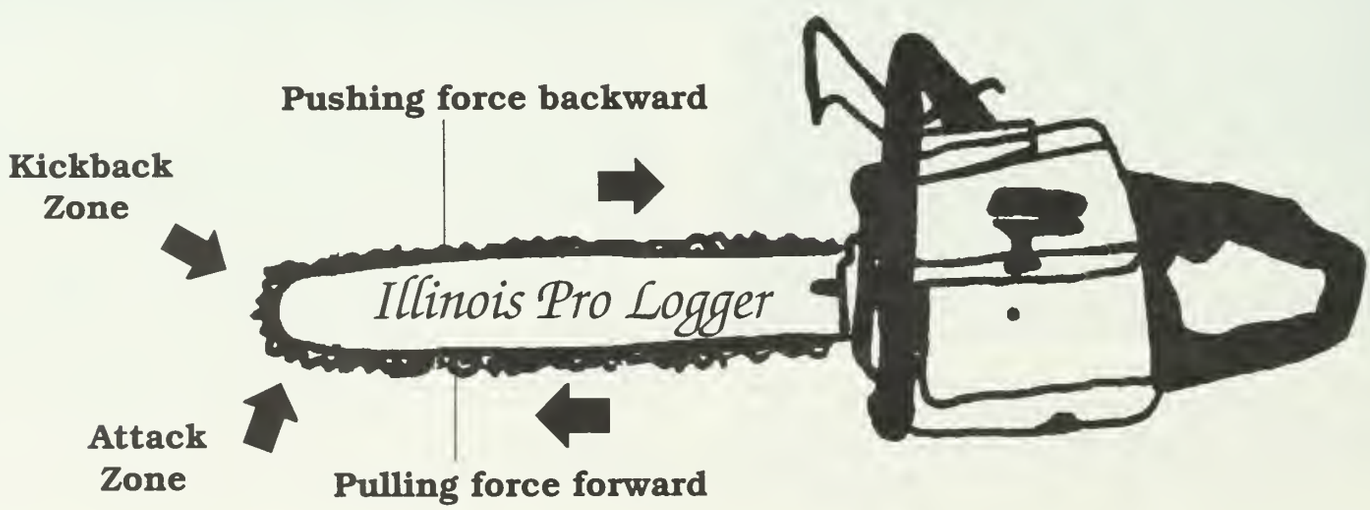
"The Illinois Pro Logger Traing Program" is printed with permission of the author, and will be featured in the Winter, 1997 issue of *The Illinois Steward* Magazine.

The Chain Saw's Reactive Forces

When operating the chain saw, it is important to be able to anticipate the saw's reative forces. Cutting with the top side of the bar will push the saw back toward the operator. Similarly, cutting with the bottom of the bar will pull the saw and the operator toward the log. Therefore, it is important to position yourself so that you do not lose your balance while cutting.

The tip of the bar is frequently used for the bore cut or for shaving and trimming branches and springpoles. It's also a site where tremendous force is experienced. The top half of the tip of the bar is the site where kickback will occur if the tip comes into contact with the log or other solid object. This will cause the tip of the bar to move violently back and up- or sidewards toward the operator. If the tip of the bar will be used for the bore cut, the lower half of the bar's tip is the part that should first contact the log or the tree's trunk.



"The Chain Saw's Reactive Forces" was reprinted with permission from *Tim's Tips - A* Game of Logging *Handbook of Study Materials for Loggers* by Tim Ard, Vice-President of the *Game of Logging* and President of Forest Applications Training, Inc. This material will be released periodically on the Internet Web Site - *WWW.FORESTAPPS.COM*

The Illinois Forestland Owners' (ILFO) Network

by Mary Lowry

Increasing information to landowners is the first and most important step toward increasing stewardship on privately owned lands in the state of Illinois. Many Illinois landowners are unaware of the programs and opportunities available to help them care for their lands. A recent survey found that 40% of Illinois landowners are unaware of cost-sharing opportunities available for forestry practices, and 62% were unaware of cost-sharing available for stewardship activities. The Department of Natural Resources and Environmental Sciences at the University of Illinois in partnership with the Illinois Council on Forestry Development and the Illinois Department of Natural Resources's Stewardship Advisory Committee have developed a statewide database to help resource professionals reach more Illinois forestland owners. The Illinois Forestland Owners' (ILFO) Network database was compiled by first identifying forested tracts larger than 15 acres using Consolidated Farm Service Agency aerial photos, and then matching these forested areas to the plat book for the appropriate county. Information about the tract was collected at each county's tax assessor's office, and was compiled into a database. The software will allow expansion of the number of records as well as type of information added to each record, variability in format of information output, and offers the ability to manipulate the data in a variety of ways. The ILFO Network participants will be protected as the database will only be available for research or educational uses by approved government agencies. A listing of forest landowner addresses would enable educators and researchers to reach landowners directly to inform them about programs, advancements and educational opportunities. The ability to contact landowners also enables landowners to interact directly with policy makers and educators to voice their needs and opinions regarding stewardship in Illinois.

This database will include those landowners who have already enrolled for cost-sharing through the Illinois Forestry Development Act (FDA), identify where in the state FDA participation has been greatest in the past, and contain a management field to indicate the number of acres under a cost-shared management plan. Access to a current mailing list would improve effectiveness of informational and educational mailings by the Illinois Department of Natural Resources and be inclusive of all forest landowners with more than 15 acres of forestland. Such a list would enable programs offered through the Cooperative Extension Service and the Illinois Forest Resource Center to be offered to all landowners, rather than limiting them to only those who are already listed elsewhere. The database will also be useful for research projects and surveys which require a representative sample of Illinois landowners to be valid.

As a mechanism to keep the list updated, the property identification number associated with each forest tract will be included in the database. To update the list we will communicate with each assessor's office to update the name and address of all of the listed parcels in each county which have changed hands since the last update.

Future Potential:

-to track forest land ownership changes in Illinois;

-to evaluate trends of forest parcel sizes of individual owners and contiguous forests;

-to expand, by addition of data, information about stewardship practices, forest management and reforestation on private lands in Illinois;

-to evolve into a database including a variety of resource information or possibly a GIS of Illinois forest resources. Upon completion, the database will contain the name, address, and parcel index number for each landowner who owns more than 15 acres of forestland in the state of Illinois or roughly 70,000 records.

Assessing the Opportunities for Private Consulting Foresters in Illinois

by Mary Lowry

There are approximately 170,000 privately owned, forested land holdings in the state of Illinois, totaling over 3.6 million acres (Iverson et al., 1989). Because of the extent of these land holdings, a huge potential demand exists for professional foresters. Although surveys have shown that most nonindustrial private forest landowners in Illinois have never sought the assistance of a professional forester, the Forest Stewardship Program has the potential to attract many landowners who have not been attracted to past programs, which emphasized timber production. The low number of professional foresters available to provide technical assistance to private landowners significantly limits the potential to improve stewardship of Illinois' privately owned forestland.

The Illinois Department of Natural Resource's (IDNR) Division of Forest Resources employs 22 District Foresters, who provide a range of free services to private landowners. In addition, a limited number of private consulting foresters, approximately 31, assist landowners on a fee basis. The supply of District Foresters is inadequate to meet landowners' demand for service. Several districts are carrying two-year backlogs of requests for assistance. The number of consultants has slowly increased over the last few years to provide some relief, however, there are still relatively few consultants practicing in Illinois. The goals of this study were:

⇒ to gain insights concerning the potential for increased business for consultants;

⇒ to discover how many landowners would be willing to pay for the services of consultants as opposed to waiting for the same services free of charge from IDNR District Foresters, and;

⇒ to identify constraints and barriers to practicing consulting forestry in Illinois.

Data was collected in two ways; by interviewing private consultants working in Illinois and by surveying private forest landowners by mail.

At this time, the business of private consulting forestry is in its infancy in Illinois. Most of the full-time consultants are fairly new to the business, and they seem to be getting by on their own initiative. A statewide association, Illinois Consulting Foresters, Inc. (ICF), does exist, but it does not have the support of all the private consultants currently working in Illinois by way of their active membership. ICF has, however, initiated the beginnings of an infrastructure for the business of consulting in Illinois through their meetings, their promotion of use of consultants, and their cooperation with IDNR personnel. Their positive accomplishments should attract other consultants as active members in the future.

Our study indicates that consultants are busy, but there is a much greater potential demand for their services than has been realized thus far. Five percent of our survey respondents had used a private consulting forester in the past, and an additional 11 percent indicated that they foresee employing a private consultant in the future. This indicates a potential increased demand for private consultants in Illinois over the next five years.

Several opportunities for consultants were identified by this study. Most important, we noted that most consultants gain clients through referrals and are not actively soliciting new business. At the same time, only 38 percent of landowner respondents reported that they think the landowner is supposed to initiate the contact with a private consultant. Therefore, there is a substantial opportunity for consultants to initiate contacts with the remaining 62 percent of landowners who do not know they are supposed to initiate the contact with a consultant. Landowners are most willing to pay for forestland appraisals as opposed to other practices. This is especially good for consultants, as appraisals are a practice that District Foresters cannot, under Division policy, implement. Other goals and practices identified as important to landowners included wildlife habitat improvements, timber stand improvement, tree planting, and decreased soil erosion. However, although landowners desire these practices, they are not willing to pay for them. Cost-sharing could help decrease the landowners' costs of these practices. Respondents to our survey received most cost-share dollars for timber stand improvement and tree planting. Consultants in Illinois offer a full range of services but spend most of their time on timber-oriented practices and much less time implementing other stewardship practices.

Landowner characteristics identified in the study as being positively related to foreseeing hiring a private consultant are:

⇒ the opinion that hiring a consultant will increase the value of forestland;

⇒ a willingness to pay for the services of a consultant;

⇒ a willingness to pay to achieve stewardship practices, and;

⇒ past implementation of timber stand improvement practices.

The likelihood of foreseeing hiring a consultant also increases as the number of forest acres owned increases. Important attributes of survey respondents who had hired a consultant in the past are:

⇒ 61 percent are business professionals;

⇒ their top goal is future investment value;

⇒ they own more forestland than other respondents, and;

⇒ 80 percent are willing to spend money for steward ship practices.

Demand for private forestry consultants does exist despite the free services from IDNR. In fact, District Forester services and recommendations may actually increase the business of consultants in Illinois. Some landowners contact a consultant because they are dissatisfied with District Foresters' long waiting lists. Consultants might be able to increase landowner interest by advertising the immediate availability of their services.

Landowners relate consultants to District Foresters, not timber buyers or loggers, but they have some misconceptions. One landowner misconception is that they think consultants cannot enroll them for cost sharing, which is not true. Teaching landowners about cost-sharing might help to alleviate their unwillingness to pay for the services of a consultant. Another misconception is that landowners think the consultant works for the timber industry and not the landowner. Landowners also expressed very strong desires to do the work on their property themselves. This might be why, as previously mentioned, landowners do not commonly seek out a consultant for advice only. "I'd rather do it myself" was the third most common answer to what would deter a landowner from hiring a consultant. However, most consultants report that they do provide landowner education aspects in their work. Marketing this advisory service might encourage "do-it-yourself-ers" to hire a private consultant in an advisory capacity.

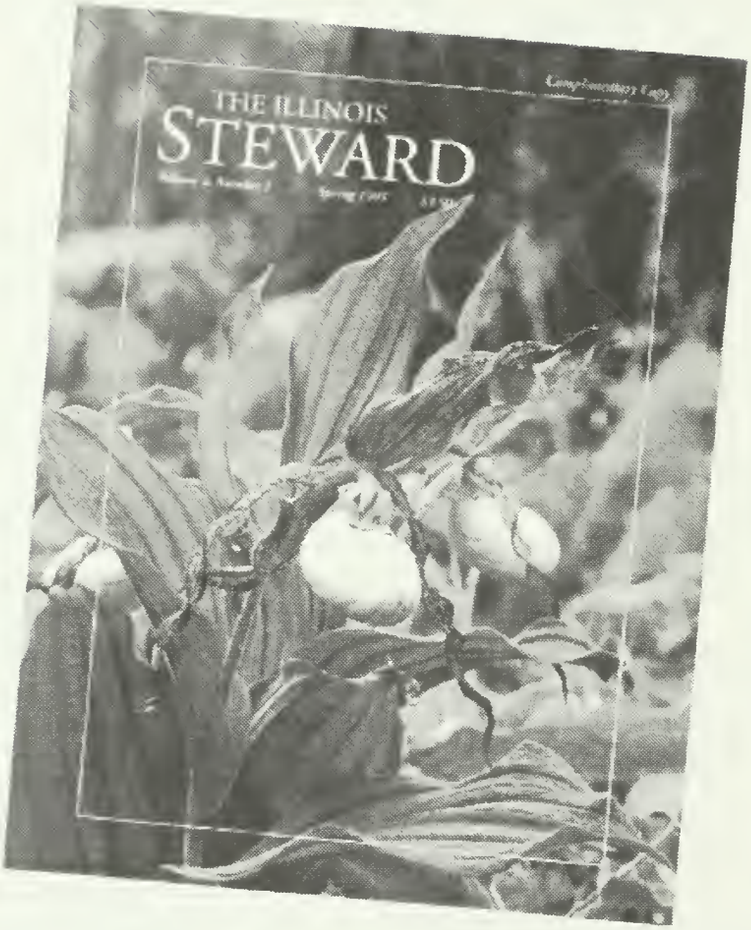
The most common deterrent to hiring a private consulting forester as identified by the landowners survey is having to pay. Consultants have to make the point to their potential clients that they are worth the investment. The opinion that hiring a forestry consultant increases the value of forestland was positively related to landowners considering hiring a consultant. If landowners realize that cost-sharing is available through consultants and that there might be a long wait for free assistance through District Foresters, they might choose to use private consultants. The second most common deterrent was never having heard of a private consulting forester. This response indicates a fundamental unawareness of the existence of the private consulting forestry profession. Making landowners aware of the profession is the first step to be taken even before educating them about potential services or benefits.

Special emphasis should be placed on removing the constraints and barriers that currently limit private consultants; specifically the high rates for insurance and the workman's compensation rates consultants have to pay. However, based on our study, we conclude that lack of knowledge about consultants and their services is the most important barrier to the future hiring of a private consulting forester.

In Illinois today, the number of private consulting foresters is slowly increasing, and the consultants indicate that business is good. Further development of structure and an increasing number of private consultants will continue to help the profession develop. As this happens, landowners will probably become more aware of the services offered by consultants, the benefits of employing consultants, and the true value of their forestland.

The most significant gains in using a private consultants can be achieved by continuing to educate landowners about stewardship, the need use forestry professionals, and the rewards of prudent forest management.

A copy of the entire publication Special Issue 1995-01, "A Study to Assess the Opportunities for Private Consulting Foresters in Illinois" *by M. K. Lowry, G. L. Rolfe and T. D. Marty, can be requested from the Department of Natural Resources and Environmental Sciences at the University of Illinois at W-503 Turner Hall, Urbana, IL, 61801.*



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Illinois' 4-H Forestry Judging Team Competes in the National Invitational in West Virginia

Every summer, Jackson's Mill State 4-H Camp near Weston, WV plays host to the National 4-H Forestry Invitational. Set in the heavily wooded foothills of the Appalachian Mountains, the 4-H Camp, once the site of the ancestoral home of General Stonewall Jackson, is an excellent facility to host this national contest for older 4-H members. This national event was started in 1980 and is sponsored by International Paper Company Foundation and attracts 4-H forestry teams from across the nation. Illinois has been sending a team since 1984.

To represent Illinois at the National Invitational, a county 4-H team must first win the State 4-H Forestry Contest, which is held annually in mid-summer at the University of Illinois. Illinois' 1996 National Invitational team hails from LaSalle County. The team members are Darcy Angel, Sara Lambert, and Justin Angel, and their coach is Dave Shiley, Natural Resource Extension Educator for the Illinois Cooperative Extension Service.

The National Invitational is a very comprehensive event. The 4-Hers who train for this competition probably know more about forestry than a starting junior in college. Nineteen states competed in this year's Invitational. The events include tree identification, tree measurement, forest insect and disease identification, compass traverse, forest evaluation, the Forestry Bowl, and a written exam.

This year, Illinois placed seventh in the competition. This was one of the closest Invitational's in its 17-year history with less than 100 points separating 1st from 9th place. We are proud of the team's accomplishment, we are especially proud of Justin Angel. Justin placed first out of 77 competitors in this year's event. For his achievement, Justin received the Will McElfresh Outstanding Scholastic Achievement Award at the Invitational's Awards Banquet. Justin's name will be engraved on a plaque, which holds the names of the past Scholastic Achievement Winners and is permanently displayed at Jackson's Mill State 4-H Camp. Congratulations Justin on your accomplishment from Illinois Forest Management Newsletter.

The Illinois 4-H Foundation is looking for donors who would be willing to help sponsor the Illinois teams' trip to the National Invitational each year. If you are interested in helping sponsor Illinois 4-Hers to this educational event, please contact John Geissal, Executive Director, Illinois 4-H Foundation, 1908 University Inn, 302 E. John St., Champaign, IL 61820; 217/333-9295.

Justin Angel, the 1996 National 4-H Forestry Invitational Outstanding Scholastic Achievement Award Winner from Serena, Illinois (LaSalle County) and his coach, *Dave Shiley*, Natural Resource Extension Educator with the Illinois Cooperative Extension Service

The Illinois 4-H Forestry Team; (l to r) Ruth Capsel, chaperon, Justin Angel, Darcy Angel, Sara Lambert, Dave Shiley, coach

ILLINOIS TIMBER PRICES

ILLINOIS
U.S. DEPARTMENT OF AGRICULTURE
ILLINOIS DEPARTMENT OF AGRICULTURE
P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4295
AGRICULTURAL STATISTICS SERVICE

DIVISION OF FOREST RESOURCES
600 North Grend Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

June 10, 1996

PRICES PAID ILLINOIS TIMBER PRODUCERS
NOVEMBER 1995 THROUGH FEBRUARY 1996

Winter sawtimber prices paid to Illinois timber growers showed no clear upward or downward trend for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1996 operations, 50% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Natural Resources, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	November 1994-February 1995		May 1995-August 1995		November 1995-February 1996	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	160	280	180	330	185	330
Basswood	100	220	100	190	105	200
Beech	70	160	70	160	60	170
Cottonwood	45	140	50	140	45	145
Sweet Gum	75	155	60	150	70	150
Elm & Hackberry	75	160	60	150	65	145
Hickory	70	175	80	170	70	175
Soft Maple	85	195	80	200	85	210
Sugar Maple	110	225	120	250	115	260
Black Oak	130	265	150	320	160	330
Pin Oak	75	165	70	160	65	160
Red Oak	245	400	220	390	235	395
White Oak	195	335	220	380	235	390
Yellow Poplar	100	240	120	230	130	250
Sycamore	60	175	60	160	60	160
Black Walnut	300	545	380	540	360	550
Woods Run Bottomland	75	160	80	190	90	200
Woods Run Upland	120	200	130	300	140	310

FACE VENEER - $ PER M BD. FT.

Red Oak	700	870	570	940	585	980
White Oak	920	1,680	940	1,550	950	1,610
Walnut	1,600	2,090	1,420	1,990	1,650	2,010

COOPERAGE - $ PER M BD. FT.

White Oak	190	400	250	420	240	415

UNPEELED PULPWOOD - $ PER TON

Ton	1.60	15.00	2.00	17.90	2.00	17.95

Timber Prices
November 1995-February 1996
June 10, 1996

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
November 1995 - February 1996

PRODUCT	UNIT	Zone 1 Stumpage	Zone 1 F.O.B. Mill	Zone 2 Stumpage	Zone 2 F.O.B. Mill	Zone 3 Stumpage	Zone 3 F.O.B. Mill
		Dollars					
1. Sawtimber							
Ash	M bd. ft.	100 - 200	300 - 450	100 - 350	200 - 450	100 - 250	150 - 300
Basswood	M bd. ft.	60 - 100	200 - 250	20 - 230	100 - 300	30 - 200	130 - 250
Beech	M bd. ft.	20 - 100	140 - 200	80 - 120	100 - 180	50 - 100	100 - 180
Cottonwood	M bd. ft.	20 - 60	140 - 180	30 - 80	100 - 180	20 - 50	100 - 160
Sweet Gum	M bd. ft.	30 - 100	140 - 200	40 - 100	100 - 160	50 - 100	130 - 180
Elm & Hackberry	M bd. ft.	20 - 80	140 - 200	20 - 100	100 - 180	30 - 100	130 - 200
Hickory	M bd. ft.	40 - 100	150 - 250	20 - 160	120 - 200	30 - 150	100 - 200
Soft Maple	M bd. ft.	30 - 80	150 - 200	30 - 150	100 - 300	80 - 150	130 - 280
Sugar Maple	M bd. ft.	40 - 150	150 - 300	60 - 200	150 - 300	100 - 200	250 - 350
Black Oak	M bd. ft.	100 - 200	250 - 450	100 - 300	200 - 550	20 - 250	220 - 400
Pin Oak	M bd. ft.	30 - 110	140 - 200	30 - 120	100 - 200	20 - 150	130 - 200
Red Oak	M bd. ft.	110 - 350	200 - 500	60 - 400	200 - 550	70 - 400	200 - 460
White Oak	M bd. ft.	100 - 300	300 - 450	60 - 350	280 - 550	70 - 450	250 - 400
Yellow Poplar	M bd. ft.	90 - 160	140 - 300	120 - 180	150 - 350	80 200	180 - 300
Sycamore	M bd. ft.	20 - 60	140 - 200	50 - 80	100 - 200	30 - 80	100 - 200
Black Walnut	M bd. ft.	200 - 400	400 - 650	200 - 500	380 - 650	200 - 600	500 - 700
Woods Run Bottomland	M bd. ft.	50 - 100	150 - 230	50 - 120	140 - 25	50 - 100	180 - 200
Woods Run Upland	M bd. ft.	100 - 300	150 - 450	50 - 300	140 - 450	50 - 200	180 - 400

		STATEWIDE Stumpage	STATEWIDE F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	310 - 1,270	420 - 1,450
White Oak	M bd. ft.	250 - 1,550	950 - 2,250
Walnut	M bd. ft.	580 - 3,020	1,060 - 3,570
3. Cooperage			
White Oak	M bd. ft.	140 - 300	350 - 440
4. Pulpwood			
Unpeeled	Ton	1.75 - 2.30	16.80 - 20.10

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	97
Scribner	3
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	2	100 - 200
Zone 2	3	100 - 200
Zone 3	5	110 - 300
ILLINOIS	10	100 - 300

VOLUME OF 1995 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	15	7	60	22
100 - 500	15	33	26	28
500 - 1,000	31	20	-	17
1,000 - 3,000	8	20	7	14
3,000 +	31	20	7	19

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - NOVEMBER 1995 - FEBRUARY 1996

	STATEWIDE STUMPAGE*
Woods Run Upland	$140-$408/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 2, 1996 No. 31

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IN THIS ISSUE

Page 1 Private Forest-land Owners of the Northern United States, 1994.

Page 14 Illinois Timber Prices

Karen Colbert

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Forestry and the Cooperative Extension Service. Our newsletter features information from many sources to help you make informed decisions concerning your woodland resources. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave. Urbana, IL 61801.

The following study report entitled *"Private Forest-land Owners of the Northern United States, 1994"* by Thomas W. Birch is reprinted in part from USDA-Forest Service Northeastern Forest Experiment Station Resource Bulletin NE-136. Where appropriate, landowner data specific to Illinois has been added to the report in bracketed, italic print. The report provides tabulated data for the Northeastern and North Central Regions of the U.S., which includes 20 states (see Figure 2 on Page 4). A copy of the complete report is available from: USDA Forest Service, Publications Distribution, 359 Main Road, Delaware, OH 43015. In the interest of space, copies of the following items are available from the Editor of this newsletter; the study's procedure for estimating the number of private forest landowners by state; the questionaire used in the study; tabular data for Illinois; and a complete list of the literature cited in the study report.

Private Forest-land Owners of the Northern United States, 1994

by Thomas W. Birch

Introduction

Our forest resources are vital to the social and economic well-being of our society. Good management of the forest requires a thorough knowledge of the resource base and the factors affecting it. Forest owners are the essential connecting link between the general public and the land. This publication reports on the Northern United States from a 1994 study of

the forest-land owners nationwide (Birch 1996) and includes estimates of the number of private forest-land ownerships. Also described are ownership objectives, expected benefits, harvest experience, intention to harvest, and management planning. The first nationwide ownership study was conducted in 1978 (Birch and others 1982). This report also reviews trends that have occurred between the 1978 and 1994 national surveys.

In this report, an ownership unit refers to persons, combinations of persons, or legal entities such as corporations, partnerships, clubs, trusts, Indian Tribes, and Native corporations. One person may own several parcels or partial interest in several parcels. An ownership unit controls a parcel or group of parcels of land. Our sample is drawn from the land itself (parcel by parcel), and the owner of record (the apparent owner) is determined. Finally, an individual who has some control of an amount of land (not exclusively the parcel sampled) responds to the survey. Therefore, ownership units and not owners are being sampled .

Landowners have rights and responsibilities regarding their land. These include the right to purchase additional land or sell existing holdings, determine land use, and choose the type and level of investment. These rights all function within the limits allowed and imposed by society. Ownership of land fixes responsibility for decisionmaking, establishes a claim on income accruing to land, and determines how wealth in land is distributed (Lewis 1980; Boxley 1977; Wunderlich 1978).

Data Collection

The USDA Forest Service's 1992 estimate of 736.7 million acres of forest nationwide, essentially unchanged from 1977, represents 33 percent of the total land area (Powell and others 1993). Of this, private "forest-land" owners (this term and others are defined at the end of this article) hold 423.8 million acres (58 percent). Two-thirds of the Nation's forests (490 million acres) are classified as timberland. Of this, 358 million acres are in private ownership. This study is based on an estimate of 129.6 million acres of private forest land, which includes essentially all of the private timberland plus samples of "other forest" in the 20 Northern States.

In 1977, for comparison, 736.6 million acres of the United States were in forest. Of this, 347 million acres were classified as privately owned timberland (USDA For. Serv. 1982). The 1978 study of private forest-land owners of the United States included an estimate of 333 million acres developed by USDA Economic Research Service, Natural Resource Economics Division, from the National Resources Inventory (NRI) of the USDA Soil Conservation Service. The difference of 14 million acres (4 percent) was attributed to differences in definitions (Birch and others 1982). It was felt that the proportions from the 1978 study could be applied to the timberland base for resource planning purposes. The NRI reported an estimated 114.1 million acres of private forest in the Northern United States; the Forest Service estimate was 122.3 million acres. Indian lands which have been added to the current estimate of private forest, totaled 855,600 acres in the northern portion of the Nation in 1978.

The other national estimate of forest-land owners is from the "Timber Resource Review of 1953" (USDA For. Serv. 1958). The 1953 data did not include estimates of owners in the East with fewer than 3 acres. Therefore, direct comparison of numbers of owners should not be made. The comparison by broad size classes could be of some use if coupled with trend data by ownership group (Wall 1981). State-level studies conducted by the Northeastern and North Central Forest Experiment Stations (Birch 1982, 1986, 1989, 1992; Birch and Dennis 1980; Birch and Kingsley 1978; Birch and Powell 1978; Carpenter and Hansen 1985; Carpenter and others 1986; Kingsley 1975, 1976; Kingsley and Birch 1977, 1980; Kingsley and Finley 1975; Widmann and Birch 1988) are comparable with the current study.

The 1978 data were gathered from 11,076 sample locations nationwide by the USDA Economic Research Service. The 1994 study was conducted by Forest Inventory and Analysis (FIA) units of the Forest Service in cooperation with the National Association of State Foresters and the USDA Natural Resources Conservation Service, in support of the Forest Stewardship Program of the Forest Service's, State and Private Forestry (Birch 1996). Questionnaires for the 1994 study were mailed to 23,334 owners of 28,194 privately owned forested sample plots. Sample-plot locations were from NRI or FIA plots. Responses from 6,810 ownerships that control 7,965 of these sample plots have been included in this report.

Private Forest Owners

An estimated 3.9 million private forest-land ownership units hold 130 million acres of forest land in the Northern United

States. These owners are diverse in legal organization, economic circumstances, personal characteristics, ownership objectives, and management experience. *[It is estimated that Illinois has slightly more than 3.64 million acres of forest land owned by 114,500 private ownership units. Sixty-four (64) percent of these ownership units hold parcels of forest land that are more than 10 acres size.]*

Nationwide, about 94 percent of the private ownerships are individuals, collectively holding 71 percent of the privately owned forest land (Fig. 1). Corporations hold 20 percent, and the remaining 9 percent is held by partnerships, undivided estates, clubs, associations, and Indian Tribes. *[Of the 73,500 ownership units with forested tracts greater than 10 acres in Illinois, 86 percent are individuals who control more than 83 percent of the privately owned forest land.]*

Since 1978, individual ownerships, including joint husband and wife and family ownerships other than family corporations, increased in number and in the proportion of private forest land owned (Fig. 1, Table 1 - **Editor's Note: All Tables referenced in this report appear at the end of this article.**). Partnerships decreased both in number of ownership units and in the proportion of private forest land owned. The number of corporations that own forest land decreased while the acreage of forest land owned increased slightly. The number of "Other" ownerships, such as sport and recreation clubs, undivided estates, trusts, and Indian Tribes, decreased since 1978 but the area owned increased.

Sport and recreation clubs are an important ownership component in such states as Pennsylvania, New York, and Michigan (Birch and Dennis 1980; Binkley and others 1980; Birch 1983; Baumgartner and Rudolph 1974). Undivided estates are important in Maine and West Virginia, (Birch and Kingsley 1978; Birch 1986). Indian Tribes are important ownership group in Maine, Michigan, Minnesota, and Wisconsin .

The Northern United States is divided into two regions (North Central and Northeastern), and four subregions: New England, Mid-Atlantic, Lake, and Central States (Fig. 2, Table 2). Data tabulations for these regions, subregions, and states are presented in the complete report available from the Forest Service's Publications Distribution Office (see beginning of this report for the address).

In 1978, the Northern United States had an estimated 3.3 million private forest-land ownership units totaling 114 million acres. The 1994 estimate is 3.9 million ownerships and 130 million acres of forest land. Forest fragmentation is particularly important in southern New England (Connecticut, Massachusetts and Rhode Island) and other areas with a dense urban population.

The distribution of ownership by size class has changed since

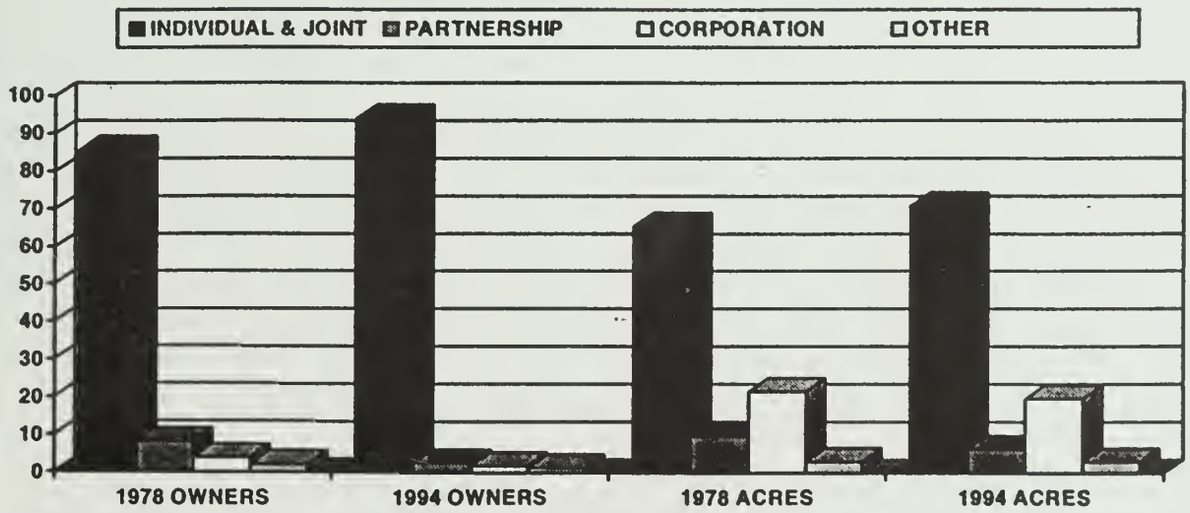


Figure 1.—Distribution of private ownerships, by form of ownership, Northern United States, 1978 and 1994.

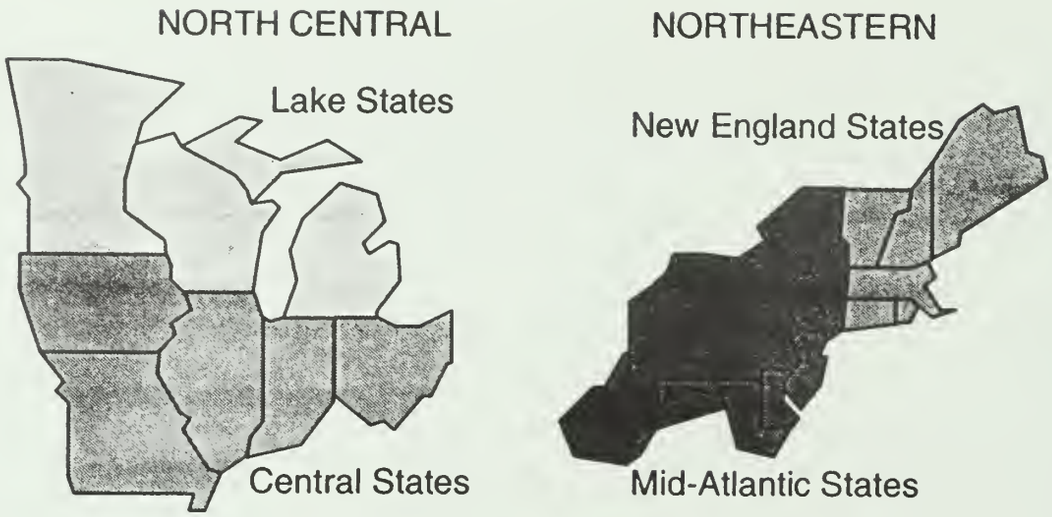


Figure 2.—Regions and sub regions for private forest-land owners of the Northern United States, 1994.

1978 (Fig. 3, Table 3). The number of private ownerships with fewer than 10 acres of forest land decreased from 2.4 to 2.0 million. Acreage in this class increased from 4.6 to 6.3 million acres. The number of ownerships with 10 to 49 acres of forest increased from 469,000 in 1978 to 1.3 million in 1994. Acreage in this class increased from 11.6 to 28.3 million acres. The number of owners with 50 to 99 acres of forest increased from 196,000 to 333,000 while the acreage owned by this group increased from 14.3 to 21.9 million acres from 1978 to 1994. *[In Illinois in 1993, 6 percent of individual ownerships owned more than 100 acres. Across all ownership units, only 10 percent own more than 100 acres, but this represents 39 percent of the forest land in Illinois.]*

The area in ownerships of more than 100 acres supports effective timber management. The proportion of ownerships with written plans increases with size of ownership. If the approximately 260,000 owners with more than 100 acres of forest worked with professional foresters, nearly 75 percent of the Northern U.S. forests could be placed under management. However, working only with this group would preclude the development of a broad-based supportive constituency (Birch and Pywell 1986).

More than 92 percent of the private ownerships control fewer than 100 acres of forest land each, and they hold more than 25 percent of private forest land. It is this portion of the resource about which fragmentation and rapid turnover are of greatest concern. While timber harvesting is not the primary reason for owning forest land for many of these owners, many have harvested and will harvest trees for sale to forest products companies.

The implications of changing ownership patterns are significant. The yearly transition to many new forest owners makes it difficult to impart information about management and activities such as stewardship programs. As a result, the use of mass communication, particularly the electronic media, is essential (Birch and Pywell 1986). More than 33 percent of the current owners acquired forest land for the first time since 1978. These owners control 24 percent of private forest land (Fig. 4, Table 4). The group with the largest decrease both in numbers of owners and acreage owned included people who first acquired forest land between 1970 and 1977. *[Thirty-five percent of owners in Illinois acquired forest land between 1960 and 1969. Only 13 percent have acquired their forest land since 1979.]*

The social and economic characteristics of private forest-land owners and their objectives must be considered when developing management programs. For example, as owners age, some may harvest because they need money for retirement. By contrast, it is believed that "baby boomers" who are well-known for their environmental concerns and high

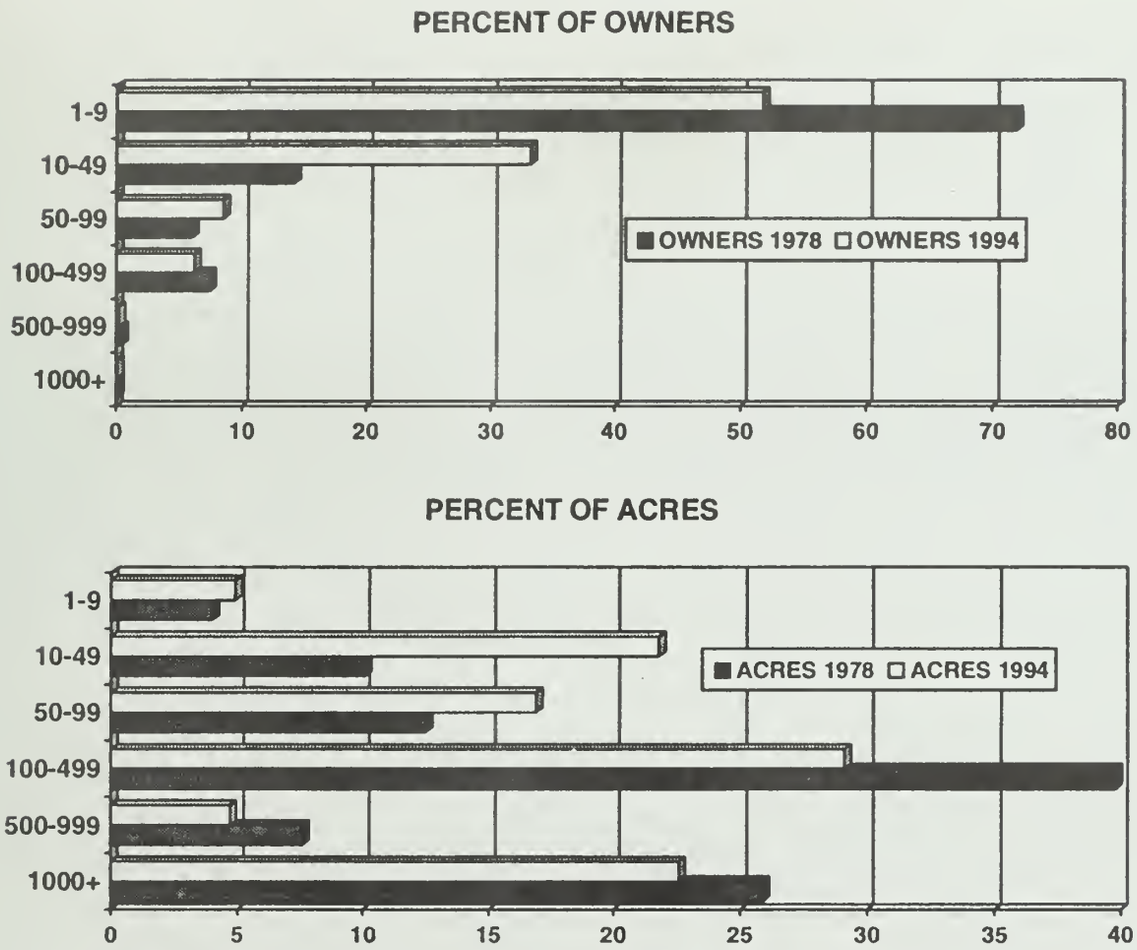


Figure 3.—Distribution of private ownerships, by size class of ownership, United States, 1978 and 1994.

education levels might not harvest because they do not need current income (Marcin and Skog 1984). But this study revealed that the assumption that these owners are adverse to cutting trees is false.

In general, the "new" individual private forest-land owner is younger, better educated, and earns more than the owner of a decade ago. Also, the proportion of farmers, retired, and "other" owners increased (Fig. 5, Table 5). "Other" includes service workers, which coincides with the increase in service-related industries in the economy from 1978 to 1994. There has been a substantial decrease in the percentage of owners in "blue collar" occupations and in the proportion of acreage held by these owners. Among farmers, the proportion of forest acreage owned has decreased. Retired owners increased both in the proportion of owners and the proportion of acreage owned, possibly because owners who retired in the last decade were from occupation groups that showed decreases rather than individuals who purchased forest land upon retirement. Also, people are retiring earlier and living longer. [*In 1993, farmers and retirees controlled 45 percent of the forest-land ownership units in Illinois, which accounted for 53 percent of the forested acres. White collar workers controlled 14 percent, and blue collar workers controlled only 5 percent of Illinois' forest land. Fifty-two (52) percent of Illinois' private forest-land owners are 55 or older. Sixty-seven (67) percent of Illinois' owners own only one forested tract and account for 49 percent of Illinois' total forest acerage. Of these owners, 65 percent live less than one mile from their forest land.*]

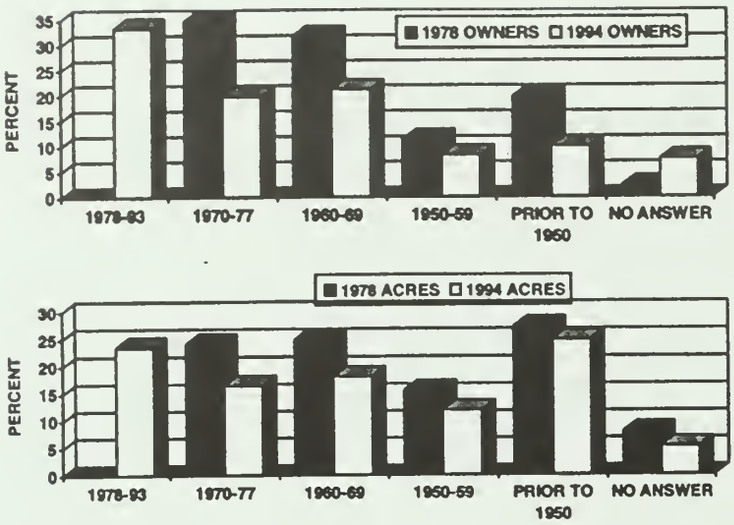


Figure 4.—Distribution of private ownerships, by year owner first acquired forest land, Northern United States, 1978 and 1994.

Owner Objectives

Forests produce many benefits for their owners, so it is not surprising that respondents express diverse reasons for owning forest land. Many potential benefits are not competitive with each other: some are derived with little or no effect on others, while some even increase when another benefit is produced.

For nearly 42 percent of the private forest-land owners in the Northern United States, the primary reason for owning forest land is that it is "part of the farm" or "residence" (Fig. 6, Table 6). In general, these ownerships hold smaller than average-size tracts (fewer than 30 acres). Nationwide, another 10 percent of the owners believe that farm or domestic use is the most important reason for owning forest land. Many of these owners consider their woodland as a source of fence posts, fuelwood, and similar products. *[Similarly in*

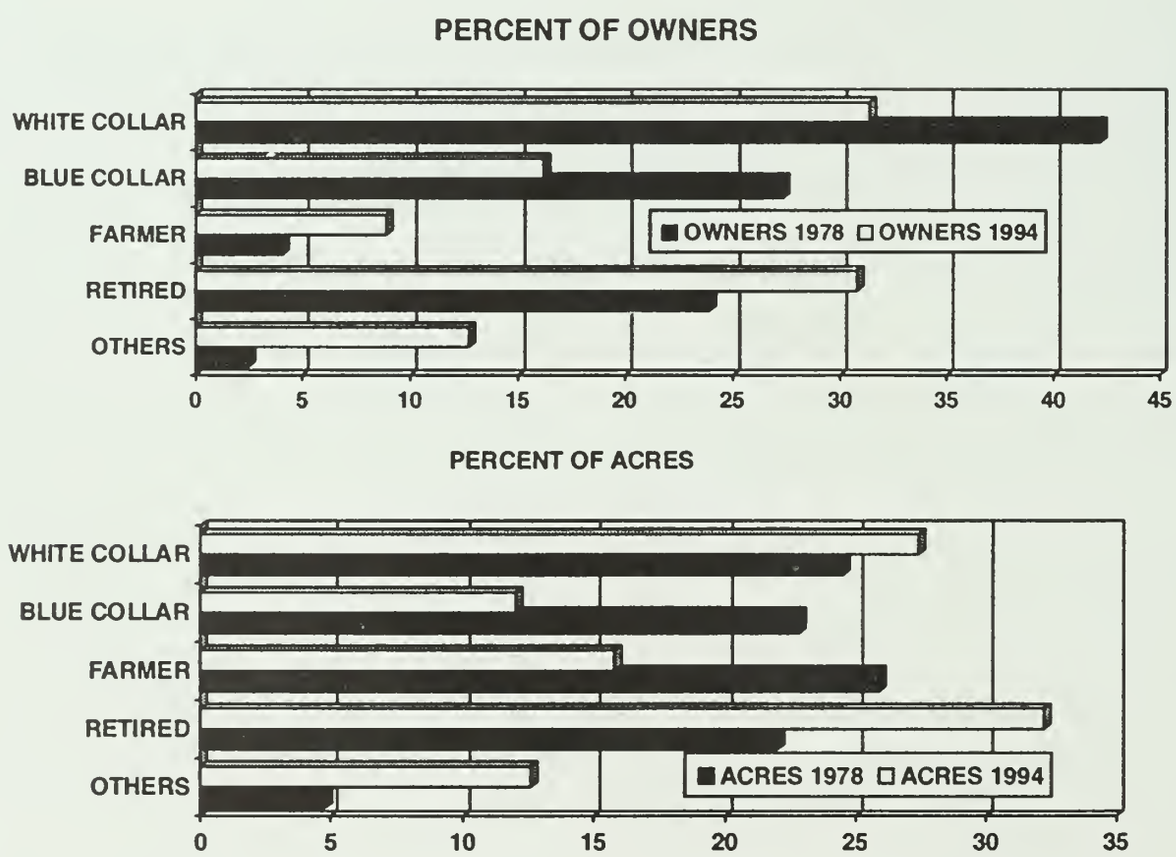


Figure 5.—Distribution of individual ownerships, by owner occupation, Northern United States, 1978 and 1994.

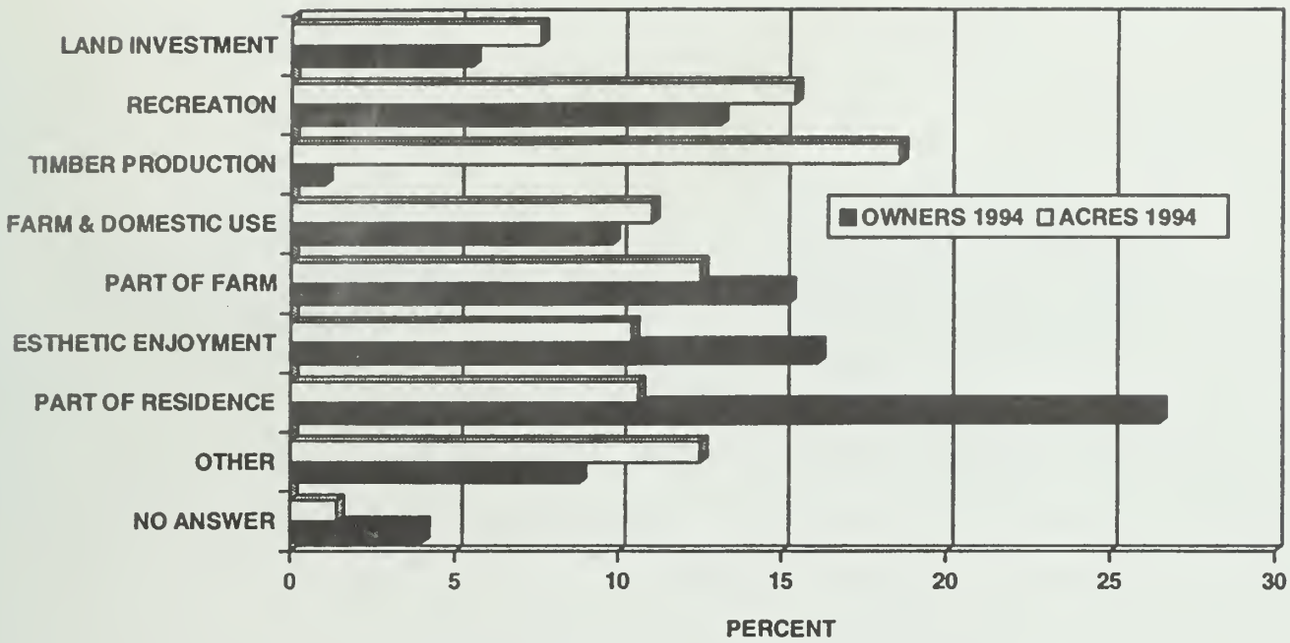


Figure 6.—Distribution of private ownerships, by primary reason for owning forest land, Northern United States, 1994.

Illinois, 47 percent of private forest landowners own forest land primarily because it is "part of the farm" or "residence." An additional 18 percent report their primary reason for owning forest as farm or domestic use. These three reasons for ownership account for 58 percent of Illinois' forest-land acreage.]

Recreation and esthetic enjoyment is the primary reason why 29 percent of the owners hold forest land. The area owned by people with these objectives represents 26 percent of private forest land. *[In Illinois, 16 percent of the owners hold their forest land for recreation and esthetic enjoyment, which accounts for 20 percent of the forested acres.]*

Land investment often is considered a hedge against inflation. Private landowners who list land investment as the primary reason for owning account for 6 percent of the owners and 8 percent of private forest land. *[In Illinois, only 4 percent of the owners hold 3 percent of the total forest acreage for*

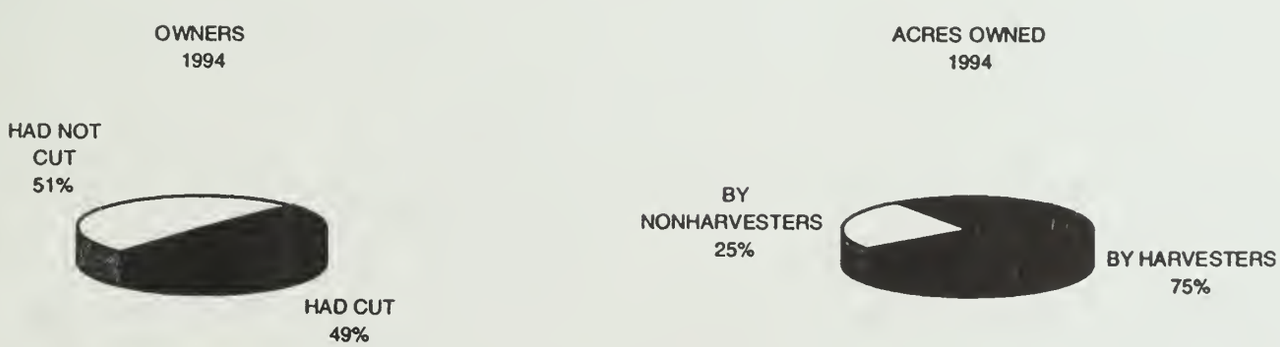


Figure 7.—Harvest experience of private ownerships and acres of forest land, Northern United States, 1994.

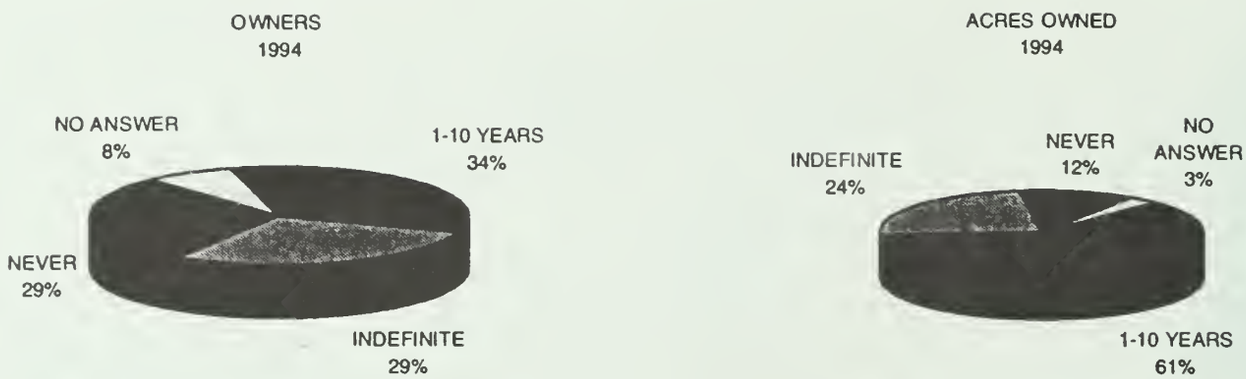


Figure 8.—Harvest intentions of private ownerships and acres of forest land owned, Northern United States, 1994.

land investment purposes.

Only 1 percent of private forest-land owners hold their land primarily for timber production, but these owners control 19 percent of private forest land. Some owners hold forest land for the minerals under the surface. Many of these are included in the other category. Also included in this category are lands owned by Indian Tribes as part of their cultural heritage. *[Only 3 percent of Illinois' forest owners hold land for the primary purpose of timber production, and this purpose represents only 5 percent of the total forested acres.]*

Benefits expected in the next 10 years provide another perspective on ownership objectives. Esthetic enjoyment predominates with 39 percent of the owners expecting it to be most important benefit (Table 7); these owners control 24 percent of private forest land. *[Similarly in Illinois, 43 percent of the owners feel esthetic enjoyment will be the most important benefit to them. This benefit accounts for 29 percent of Illinois' forest acres.]*

Nationwide, expected increase in land value is next in importance as a benefit, accounting for 14 percent of the owners and 14 percent of the private forest. Only 3 percent of the owners consider income from the sale of timber as the most important benefit; they control 24 percent of the private forest. Firewood is the most important benefit for 5 percent of the owners; they hold 5 percent of private forest land. *[In Illinois, the second most important benefit expected in the next 10 years is farm and domestic use with 13 percent of the ownerships and 15 percent of the acres. This is followed by recreation with 7 percent of the owners and 12 percent of the acres. Expected increase in land value follows recreation with 6 percent of the owners and 11 percent of the acres. Only slightly more than 3 percent of the owners consider sale of timber as the most important expected benefit. However, these owners hold 12 percent of Illinois' forest acreage.]*

Timber Harvesting Behavior

There is a positive attitude toward and experience with timber harvesting. About half of the private owners have harvesting experience; they control 75 percent of private forest land (Fig. 7, Table 8). *[In Illinois, 46 percent of the owners have experienced some harvesting on nearly 63 percent of Illinois' forest acreage. Fifty-three percent of these owners are 55 years old or older, and 46 percent are under the age of 55. Interestingly, only .5 percent of these owners are under 34 years of age, but 100 percent of these have harvested timber.]*

Respondents stating that they intend to harvest in the next 10 years account for an estimated 35 percent of private forest-land owners and 61 percent of the private acreage. Conversely, 29 percent of the owners say they never intend to harvest, they hold only 12 percent of private forest land (Fig. 8, Table 9). The 29 percent of the owners with indefinite harvest plans control 24 percent of the private acreage. *[In Illinois, 35 percent of owners plan to harvest within the next ten years, representing 38 percent of the forested acreage in tracts greater than 10 acres. Twenty-six percent of Illinois' owners reported they*

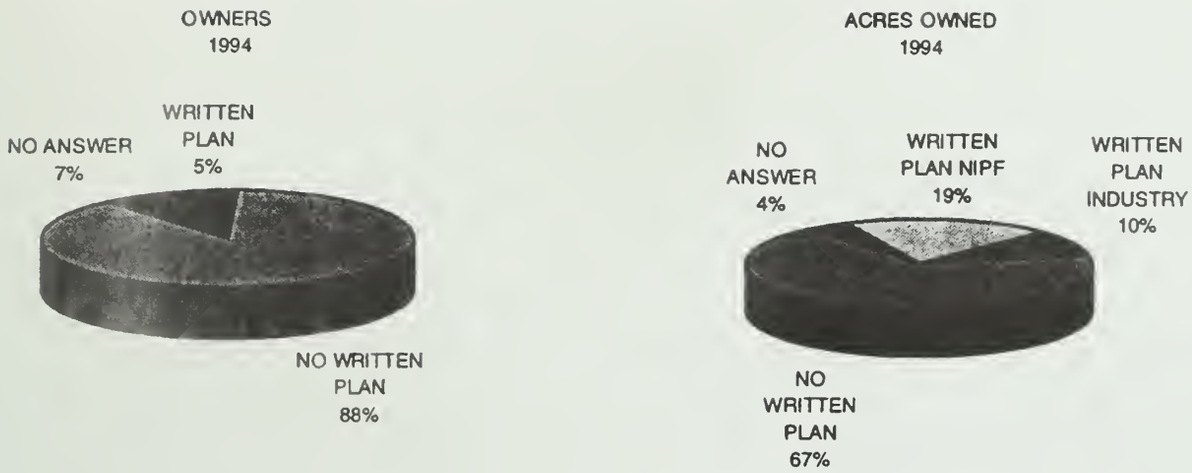


Figure 9.—Distribution of private ownerships and acres of forest land owned, by whether a written management plan had been prepared, Northern United States, 1994.

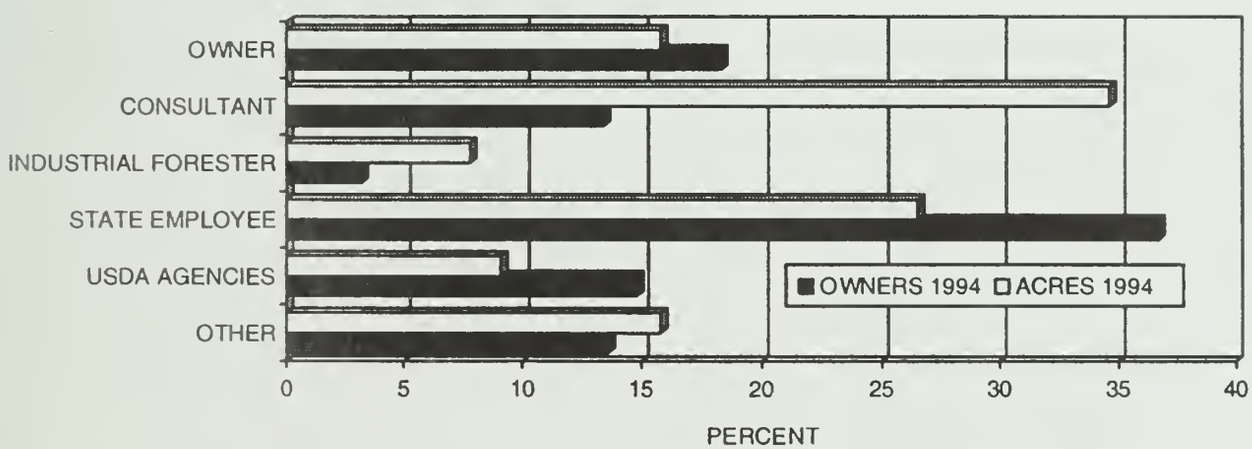


Figure 10.—Distribution of nonindustrial private ownerships (NIPF) and acres of forest land owned, by who prepared the written plan, Northern United States, 1994.

never intend to harvest. This represents 19 percent of the forest land in Illinois. An additional 24 percent of the owners holding 28 percent of the forested land were indefinate about harvest plans.]

Management Planning

With the advent of the Forest Stewardship Program there has been increased interest in written management plans. An estimated 5 percent of private forest-land owners have a written management plan for their acreage (Fig. 9, Table 10). These owners control 29 percent of private forest land.

Forest industry owns 34 percent of the forest land held by those with a written plan. The other 66 percent of the forest area is controlled by more than 205,500 nonindustrial private forest (NIPF) owners with some form of written plan.

Nearly 18 percent of the NIPF owners with a management

plan prepared it themselves (Fig. 10, Table 11). These owners control 16 percent of the area covered by written plans. This includes some ownerships that employ foresters to prepare their plan. An estimated 13 percent of the NIPF plans were prepared by consultants, accounting for 35 percent of forest land covered by written plans. Industrial foresters prepared 3 percent of the plans for an estimated 8 percent of the area covered by NIPF written plans.

State service foresters and wildlife biologists have been preparing management plans for a long time. They wrote 37 percent of the plans for NIPF owners that cover 27 percent of the private acreage. Agencies such as the USDI Bureau of Indian Affairs, USDA Extension Service, and USDA Natural Resources Conservation Service prepared the remaining 28 percent of the plans that cover the remaining 25 percent of the forest under a management plan. Totals exceed 100 percent because some owners listed more than one agency or person preparing their plans.

Conclusion

The extent to which the private forest resources of the United States are needed, managed, and utilized in the future will depend on the complex set of interrelated factors that operated in the past. These include trends in the tastes and preferences of the owners of forest land; technological changes in the production, marketing, and utilization of wood products and their substitutes; strength of the American dollar, trade deficits, inflation, and other economic forces; attitudes of forest-land owners and other citizenry toward timber management and cutting; and attractiveness of local business climates and living environments to developing industries. Only time will tell how all these factors will interact. For now, watchful monitoring and good stewardship is needed to maintain the productivity of forested ecosystems for future generations.

Definition of Terms

Farmer-owned lands. Lands owned by farm operators, whether part of the farmstead or not.

Forest Industries. Companies or individuals operating primary wood using plants.

Forest Industry lands. Lands owned by companies of individuals operating wood using plants.

Forest land. Land that is at least 16.7 percent stocked (contains at least 7.5 square feet of basal area) by forest trees of any size, or that formerly has such tree cover and is not currently developed for non-forest use. (Forest trees are woody plants that have a well developed stem and usually are more than 12 feet in height at maturity.) The minimum area for classification of forest land is one acre.

Ownership unit. All types of legal entities having ownership interest in land, regardless of the number of people involved. It is the locus of decision making for each parcel, whether an individual (sole proprietor), group of individuals (partnerships, or undivided estates), or legal person (corporation, trust, or tribe).

Private timberland. All timberland other than that owned by federal, state, or local governments or their agencies.

Timberland. Forest land that is producing or capable of producing crops of industrial wood (more than 20 cubic feet/acre/year) and that is not withdrwan from timber utilization.

Other forest. Forest land other than timberland, including: oak woodlands in western Texas and Oklahoma; Juniper woodlands in California and Oregon; Pinon Juniper land in the Rocky Mountains; and much of interior Alaska.

Table 1. Estimated number and percentage of private ownership units and acres of forest land owned, by type of ownership, Northern United States, 1978 and 1994

Ownership	1978 Thousands	1978 Percent	1994 Thousands	1994 Percent
		OWNERS		
Individual	2,823	85.8	3,703	94.2
Partnership	267	8.1	103	2.6
Corporation	128	3.9	74	1.9
Other	72	2.2	51	1.3
Total	3,290	100.0	3,931	100.0

Ownership	1978 Millions	1978 Percent	1994 Millions	1994 Percent
		ACRES		
Individual	74.7	65.5	91.8	70.9
Partnership	11.2	9.8	8.2	6.3
Corporation	24.6	21.6	25.7	19.8
Other	3.6	3.1	3.9	3.0
Total	114.1	100.0	129.6	100.0

Table 2. Estimated number and percentage of private ownership units and acres of forest land owned, by state, subregion, and region, Northern United States, 1978 and 1994

Region, subregion, and state	1978 Owners	1978 Acres	1994 Owners	1994 Acres
	(Thousands)	(Millions)	(Thousands)	(Millions)
Connecticut	95.6	1.329	102.0	1.553
Maine	241.4	15.698	255.6	17.060
Massachusetts	143.6	2.835	212.8	2.529
New Hampshire	122.3	4.307	83.7	4.144
Rhode Island	12.9	.123	26.7	.338
Vermont	53.3	3.926	80.5	3.993
New England	669.1	28.218	761.3	29.617
Delaware	9.5	.318	17.3	.346
Maryland	42.2	1.886	130.6	2.272
New Jersey	108.0	1.283	88.7	1.401
New York	824.8	10.406	475.4	14.367
Pennsylvania	492.8	10.677	513.9	12.508
West Virginia	248.4	9.779	260.4	10.745
Mid-Atlantic	1,725.7	34.349	1,486.3	41.640
North East	2,394.8	62.567	2,256.4	71.328
Illinois	61.0	2.860	114.5	3.641
Indiana	48.1	3.740	151.3	3.771
Iowa	11.6	1.724	55.4	1.807
Missouri	80.7	10.630	307.2	11.630
Ohio	133.6	5.420	329.2	7.191
Central	335.0	24.373	957.7	28.040
Michigan	301.7	11.477	332.7	12.039
Minnesota	62.6	6.510	147.4	7.317
Wisconsin	195.4	9.127	245.8	10.898
Lake	559.7	27.114	725.9	30.254
North Central	894.7	51.488	1,683.6	57.002
Northern United States:	3,289.5	114.054	3,931.2	129.551

Table 3. Estimated number and percentage of private ownership units and acres of forest land owned, by size class of ownership, Northern United States, 1978 and 1994

Size class (no. acres)	1978 Thousands	1978 Percent	1994 Thousands	1994 Percent
		OWNERS		
1-9	2,364	71.9	2,036	51.8
10-49	469	14.2	1,305	33.2
50-99	196	6.0	333	8.5
100-499	242	7.4	242	6.2
500-999	13	.4	10	.2
1000+	5	.1	5	.1
Total	3,289	100.0	3,931	100.0

Size class (no. acres)	1978 Millions	1978 Percent	1994 Millions	1994 Percent
		ACRES		
1-9	4.6	4.0	6.3	4.9
10-49	11.6	10.1	28.3	21.8
50-99	14.3	12.5	21.9	16.9
100-499	45.4	39.8	37.7	29.1
500-999	8.7	7.6	6.1	4.7
1000+	29.5	25.9	29.3	22.6
Total	114.1	100.0	129.6	100.0

Table 4. Estimated number and percentage of private ownership units and acres of forest land owned, by date of acquisition, Northern United States, 1978 and 1994

Date of acquisition	1978 Thousands	1978 Percent	1994 Thousands	1994 Percent
		OWNERS		
1978-93	0	0	1,308	33.3
1970-77	1,142	34.7	780	19.8
1960-69	1,045	31.8	832	21.2
1950-59	376	11.4	321	8.2
Prior to 1950	652	19.8	395	10.0
No answer	75	2.3	295	7.5
Total	3,290	100.0	3,931	100.0

Date of acquisition	1978 Millions	1978 Percent	1994 Millions	1994 Percent
		ACRES		
1978-93	0	0	30.4	23.5
1970-77	27.5	24.2	21.5	16.5
1960-69	28.4	24.9	23.5	18.1
1950-59	17.9	15.6	15.4	11.9
Prior to 1950	31.2	27.3	32.1	24.8
No answer	9.1	8.0	6.7	5.2
Total	114.1	100.0	129.6	100.0

Table 5. Estimated number and percentage of private ownership units and acres of forest land owned, by owner's occupation, Northern United States, 1978 and 1994

Occupation	1978 Thousands	1978 Percent	1994 Thousands	1994 Percent
		OWNERS		
White collar	1,190	42.2	1,163	31.4
Blue collar	773	27.3	600	16.2
Farmer	115	4.1	330	8.9
Retired	675	23.9	1,140	30.8
Other	70	2.5	470	12.7
Total, individuals	2,823	100.0	3,703	100.0

Occupation	1978 Millions	1978 Percent	1994 Millions	1994 Percent
		ACRES		
White collar	18.3	24.5	25.2	27.4
Blue collar	17.0	22.8	11.0	12.0
Farmer	19.4	25.9	14.6	15.8
Retired	16.5	22.0	29.5	32.2
Other	3.5	4.8	11.5	12.6
Total, individuals	74.7	100.0	91.8	100.0

Table 6. Estimated number and percentage of private ownership units and acres of forest land owned, by primary reason for owning forest land, Northern United States, 1994

Reason for owning	Owners Thousands	Owners Percent	Acres Millions	Acres Percent
Land investment	215.4	5.5	9.8	7.6
Recreation	515.8	13.1	19.9	15.4
Timber production	38.1	1.0	24.2	18.6
Farm & domestic use	383.9	9.8	14.2	11.0
Enjoyment of owning	634.8	16.1	13.5	10.4
Part of farm	599.4	15.2	16.2	12.5
Part of residence	1,043.2	26.5	13.7	10.6
Other	344.9	8.8	16.3	12.5
No answer	155.5	4.0	1.8	1.4
Total	3,931.2	100.0	129.6	100.0

Table 7. Estimated number and percentage of ownership units and acres of forest land owned, by primary benefit expected in the next 10 years from owning forest land, Northern United States, 1994

Expected benefit	Owners		Acres	
	Thousands	Percent	Millions	Percent
Land value increase	553.9	13.8	17.9	13.8
Recreation	496.7	12.7	20.0	15.4
Timber production	124.9	3.2	30.4	23.5
Farm & domestic use	523.9	13.3	13.8	10.6
Enjoyment of owning	1,546.0	39.3	30.6	23.7
Firewood	201.9	5.1	6.4	4.9
Other	223.4	5.7	6.6	5.1
No answer	280.5	7.1	3.9	3.0
Total	3,931.2	100.0	129.6	100.0

Table 8. Estimated number and percentage of private ownership units and acres of forest land owned, by harvest experience, Northern United States, 1994

Harvest experience	Owners		Acres	
	Thousands	Percent	Millions	Percent
Harvester	1,928.1	49.0	97.0	74.9
Nonharvester	2,003.1	51.0	32.6	25.1
Total	3,931.2	100.0	129.6	100.0

Table 9. Estimated number and percentage of private ownership units and acres of forest land owned, by expected time of future harvest, Northern United States, 1994

Intention to harvest	Owners		Acres	
	Thousands	Percent	Millions	Percent
1-10 years	1,357.0	34.5	79.3	61.2
Indefinite	1,126.0	28.6	31.5	24.3
Never	1,150.9	29.3	14.9	11.5
No answer	297.3	7.6	3.9	3.0
Total	3,931.2	100.0	129.6	100.0

Table 10. Estimated number and percentage of private ownership units and acres of forest land owned, by whether a written management plan was prepared, Northern United States, 1994

Preparation of management plan	Owners		Acres	
	Thousands	Percent	Millions	Percent
Owners with written plans:	206.5	5.2	38.1	29.4
Forest industry	1.0	.5	12.9	33.9
NIPF owners	205.5	99.5	25.2	66.1
Owners with no written plan	3,449.5	87.8	86.2	66.4
No answer	275.2	7.0	5.3	4.2
Total 3,931.2	100.0	129.6	100.0	

Table 11. Estimated number and percentage of private ownership units and acres of forest land owned, by who prepared written management plan for NIPF owners, Northern United States, 1994

Preparation of management plan	Owners		Acres	
	Thousands	Percent	Millions	Percent
NIPF owners with written plan:	205.5	100.0	25.2	100.0
Plan prepared by:				
Owner	37.5	18.3	4.0	15.8
Consultant	27.5	13.4	8.7	34.6
Industrial forester	6.6	3.2	2.0	7.8
State employee	75.4	36.7	6.7	26.5
Extension	6.8	3.3	.6	2.5
NRCS[a]	23.6	11.5	1.7	6.6
Other	28.1	13.6	4.0	15.8
Total[b]	205.5	100.0	27.7	109.6

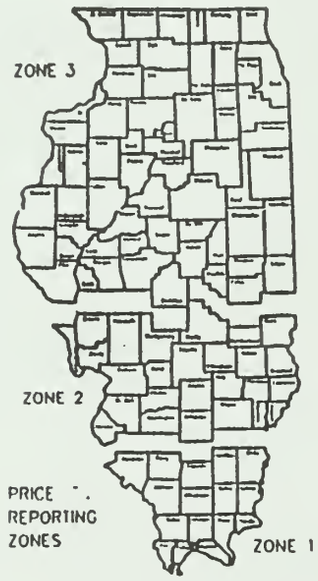
[a]National Resources Conservation Service.
[b]Totals exceed 100 percent because some plans prepared by more than one person.

ILLINOIS TIMBER PRICES

ILLINOIS
U.S. DEPARTMENT OF AGRICULTURE
ILLINOIS DEPARTMENT OF AGRICULTURE
P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4295
AGRICULTURAL STATISTICS SERVICE

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

December 4, 1996



PRICES PAID ILLINOIS TIMBER PRODUCERS
MAY 1996 THROUGH AUGUST 1996

Summer sawtimber prices paid to Illinois timber growers showed no clear upward or downward trend for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1996 operations, 42% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid.. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Natural Resources, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SPECIES	May 1995-August 1995		November 1995-February 1996		May 1996-August 1996	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
SAWTIMBER - $ PER M BD. FT.						
Ash	180	330	185	330	170	340
Basswood	100	190	105	200	100	230
Beech	70	160	60	170	80	180
Cottonwood	50	140	45	145	50	150
Sweet Gum	60	150	70	150	85	170
Elm & Hackberry	60	150	65	145	60	150
Hickory	80	170	70	175	80	160
Soft Maple	80	200	85	210	95	210
Sugar Maple	120	250	115	260	120	190
Black Oak	150	320	160	330	160	270
Pin Oak	70	160	65	160	65	160
Red Oak	220	390	235	395	230	390
White Oak	220	380	235	390	220	390
Yellow Poplar	120	230	130	250	120	350
Sycamore	60	160	60	160	70	150
Black Walnut	380	540	360	550	320	510
Woods Run Bottomland	80	190	90	200	85	180
Woods Run Upland	130	300	140	310	110	300
FACE VENEER - $ PER M BD. FT.						
Red Oak	570	940	585	980	600	950
White Oak	940	1,550	950	1,610	1,000	1,800
Walnut	1,420	1,990	1,650	2,010	1,600	2,000
COOPERAGE - $ PER M BD. FT.						
White Oak	250	420	240	415	280	600
UNPEELED PULPWOOD - $ PER TON						
Ton	2.00	17.90	2.00	17.95	1.50	16.80

Timber Prices
May 1996-August 1996
December 2, 1996

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
May 1996 - August 1996

PRODUCT	UNIT	Zone 1 Stumpage	Zone 1 F.O.B. Mill	Zone 2 Stumpage	Zone 2 F.O.B. Mill	Zone 3 Stumpage	Zone 3 F.O.B. Mill
				Dollars			
1. Sawtimber							
Ash	M bd. ft.	100 - 200	300 - 400	150 - 350	350 - 400	120 - 200	300 - 420
Basswood	M bd. ft.	NA	NA	50 - 150	150 - 350	50 - 150	190 - 300
Beech	M bd. ft.	65 - 100	150 - 200	NA	NA	NA	NA
Cottonwood	M bd. ft.	40 - 90	150 - 210	40 - 60	120 - 180	40 - 60	130 - 190
Sweet Gum	M bd. ft.	70 - 100	150 - 200	NA	NA	NA	NA
Elm & Hackberry	M bd. ft.	60 - 100	150 - 200	50 - 100	120 - 180	50 - 100	150 - 190
Hickory	M bd. ft.	70 - 100	120 - 180	50 - 100	120 - 180	50 - 100	120 - 190
Soft Maple	M bd. ft.	60 - 95	140 - 250	40 - 150	120 - 250	60 - 100	190 - 250
Sugar Maple	M bd. ft.	60 - 130	140 - 200	100 - 150	150 - 250	120 - 150	190 - 250
Black Oak	M bd. ft.	80 - 200	200 - 300	100 - 200	200 - 400	100 - 200	190 - 380
Pin Oak	M bd. ft.	80 - 100	130 - 200	50 - 120	120 - 200	50 - 150	150 - 190
Red Oak	M bd. ft.	100 - 250	250 - 400	100 - 250	250 - 550	150 - 250	300 - 420
White Oak	M bd. ft.	200 - 300	350 - 450	180 - 350	420 - 650	150 - 300	300 - 480
Yellow Poplar	M bd. ft.	100 - 150	300 - 400	100 - 140	300 - 400	NA	NA
Sycamore	M bd. ft.	50 - 95	160 - 200	50 - 100	100 - 200	40 - 75	100 - 200
Black Walnut	M bd. ft.	200 - 400	450 - 550	220 - 400	450 - 550	200 - 400	450 - 550
Woods Run Bottomland	M bd. ft.	60 - 100	170 - 230	50 - 150	150 - 200	90 - 100	NA
Woods Run Upland	M bd. ft.	95 - 150	170 - 400	50 - 150	150 - 400	75 - 150	NA

		STATEWIDE Stumpage	STATEWIDE F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	200 - 1,250	450 - 1,500
White Oak	M bd. ft.	300 - 1,500	1,000 - 2,000
Walnut	M bd. ft.	250 - 1,700	1,000 - 3,000
3. Cooperage			
White Oak	M bd. ft.	200 - 400	400 - 700
4. Pulpwood			
Unpeeled	Ton	1.75 - 2.45	16.50 - 20.00

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	100
Scribner	0
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	3	100 - 180
Zone 2	13	100 - 150
Zone 3	5	150 - 180
ILLINOIS	21	100 - 180

VOLUME OF 1995 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	15	7	60	22
100 - 500	15	33	26	28
500 - 1,000	31	20	-	17
1,000 - 3,000	8	20	7	14
3,000 +	31	20	7	19

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - MAY 1996 - AUGUST 1996

	STATEWIDE STUMPAGE*
Woods Run Upland	$100-$323/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

JUL 16 1997
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Volume 1, 1997 No. 32

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Karen Colbert

Illinois Forest Management Newsletter is produced by the University of Illinois Department of Natural Resources and Environmental Sciences and the Cooperative Extension Service. Our newsletter features information from many sources to help you make informed decisions concerning your woodland resources. We encourage your questions and comments which we will share with our readers as space permits. Direct your inquiries to: Editor, IFM Newsletter, W-503 Turner Hall, 1102 S. Goodwin Ave. Urbana, IL 61801.

HOW TO MEASURE TREES TO DETERMINE THEIR BOARD-FOOT VOLUME AND VALUE

We frequently receive calls from landowners who have been approach by a buyer who has expressed interest in their timber. The first question posed in the conversation normally is..."How do I know if I have been offered a fair price?"...and is followed by..."How do I know what my timber is worth?" Obviously there is no way of answering the first part of the question without walking the timber, making some observations, and taking some measurements. And even then, what is a fair offer to one person may be totally out of line to another. A buyer may be making a genuinely fair offer based on his ability to market the timber he buys. Another buyer might come along with a totally different set of markets and be able to make the first buyer look like an absolute crook in the eyes of the landowner. Who made the fair offer? Most likely both did, but their ability to market the timber reflects what they could afford to pay for it. The following example emphasizes this point. A recent sealed bid sale in Illinois brought bids in the range of $32,000 to $123,000. Most of the bids were grouped toward the bottom of this range. It's probably not hard to guess who the landowner sold to, and in fact, most of the unsuccessful timber buyers wanted to know how the successful bidder could afford to pay that much for the timber. As it turned out he had a veneer market for the large volume of sycamore logs that the others did not have.

Our suggestion to landowners who know little about their timber or how to market it is not to get in a hurry and give

serious thought to hiring a forester to represent their interest. Nationwide less that 10% of the timber sold involves a professional forester. In Illinois, this figure is probably closer to 5%. The more you know about your timber, the better prepared you will be deal with unsolicited offers that come your way. You may be pleasantly surprised to find that something you considered to be of minimal value may, in fact, be worth quite a bit, and with a little management could be worth considerably more in the future.

To answer the second part of the question..."How do I know what my timber is worth?"...you could hire a consulting forester to appraise your timber or you could learn how to measure and evaluate the timber yourself. This article presents the basics on tree measurement for landowners who want to learn more about the value of their timber.

The two measurements used to estimate the volume of a tree or log are diameter and height or length. Determination of the volume of wood in a tree is surprisingly complicated. The main stem (bole), for one thing, does not fit any standard geometric form. However, volume tables have been developed that ease the cumbersome task of volume computation.

Taking tree measurements requires the use of some simple instruments which can be purchased or made. If you decide to order the equipment described below, supply sources include:

Ben Meadows Company
3589 Broad St.
P.O. Box 80549
Atlanta, GA 30366-9821
1-800-241-6401
or
Forestry Suppliers, Inc.
205 West Rankin St.
P.O. Box 8397
Jackson, MS 39284-8397
1-800-647-5368
or
International Reforestation Suppliers
P.O. Box 4195
Pineville, LA 71361
1-800-321-1037

All have catalogs available which you can request.

Diameter Measurement

The diameter of the exposed end of a log is easily measured using a ruler or carpenter's tape. A standing tree presents a problem. The standard point of measure for tree diameter is 4 1/2 feet above the ground (above the ground on the uphill side if the tree is on a slope). This is called diameter breast high, and is usually abbreviated as "DBH."

Diameter tape

A diameter tape can be used to measure a tree's diameter. The tape is calibrated to read the tree's diameter by measuring its circumference or distance around its trunk. If used correctly, this is a very accurate measuring device and the tree's diameter can be read to the nearest tenth of an inch.

Diameter tapes cost about $20 to $50 each. If you wish, you may use a regular cloth measuring tape to measure around the tree and divide the reading by 3.14 to obtain the diameter. Measuring DBH to the nearest even inch (12, 14, 16, etc.) is adequate for the forest measurements described in this article. A 12-inch tree has a DBH between 11.1 and 13.0 inches, a 14-inch tree between 13.1 and 15.0 inches, etc.

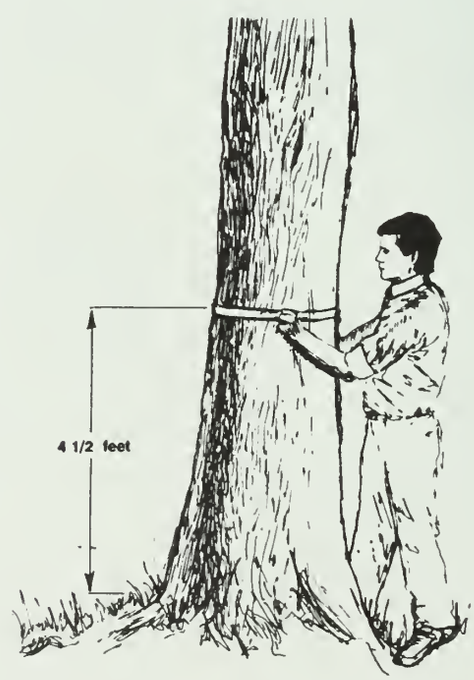


Figure 1. Measuring tree diameter with a diameter tape.

There are certain rules one should remember when using a diameter tape. These are:

⇒ Be certain DBH is measured at 4 1/2 feet above the ground on the uphill side. If a tree forks below the measuring point, measure it as two trees. If it forks above the measuring point, measure it as one tree (Figure 2).

⇒ Do not let the tape sag—it must be horizontal around the tree (Figure 3).

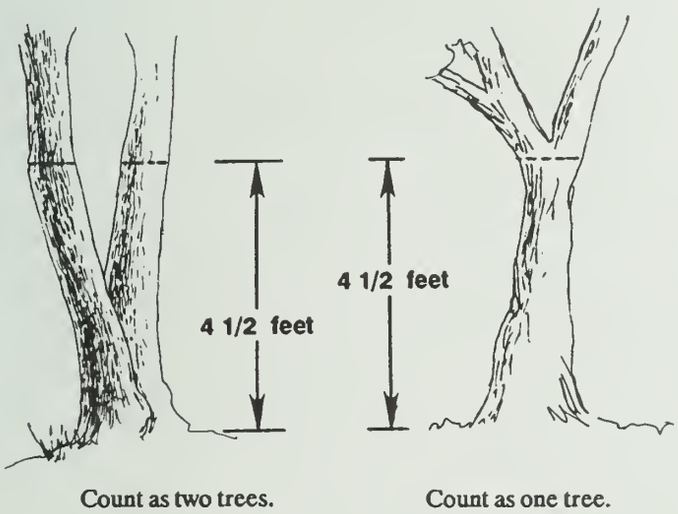


Figure 2. Where to measure diameter of a forked tree.

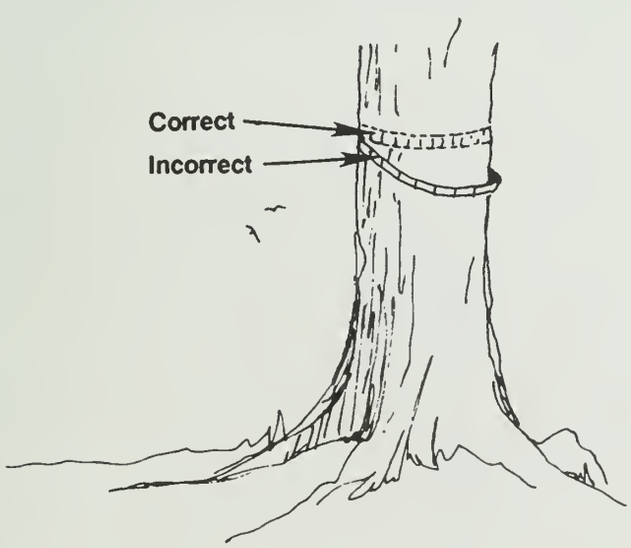


Figure 3. Correct and incorrect use of the diameter tape.

The Tree/Log Scale Stick

A rather ingenious instrument, the tree/log scale stick, speeds the process of DBH measurements. It is not as accurate as the diameter tape, but if used with reasonable care it is adequate for timber inventory work. Tree/log scale sticks cost around $10 and usually include the Merritt hypsometer used for estimating tree heights (described later).

A purchased scale stick may not work for everyone since most are calibrated for use at a 25 inch distance (reach) from the eye. If your fully extend reach is less than 25 inches, the measurements you take with a purchased scale stick will be wrong. A scale stick can be easily constructed to fit any reach using the following formula:

$$I = \sqrt{\frac{ED^2}{E + D}}$$

where:
I = distance in inches from zero end of the stick to scale graduation,
E = distance in inches from eye to the stick (your reach distance, which for many people is 25 inches), and
D = tree's diameter in inches.

A strip of wood about 1/4-inch thick, 1 inch wide, and 27 inches long can be used to fashion a scale stick. Use the formula above to mark off the DBH values on the stick. For example, if your reach is 23 inches, the diameter markings in Table 1 (next page) would be made on the stick as shown in Figure 4 below.

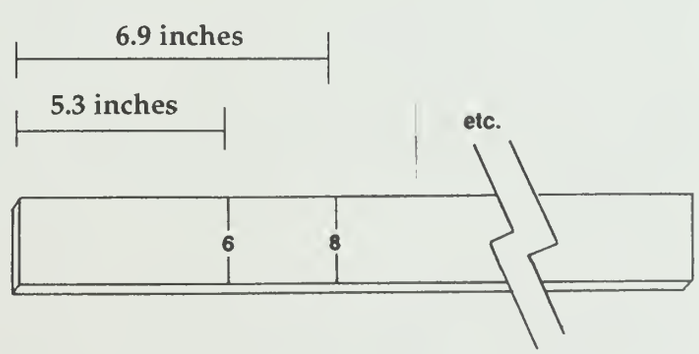


Figure 4. Marking a scale stick for diameter.

Table 1. Distances to mark on a scale stick for DBH readings (Note: for a person with a 23 inch reach)

Diameter	Distance from Zero end of the stick in inches
2	1.9
4	3.7
6	5.3
8	6.9
10	8.3
12	9.7
14	11.0
16	12.3
18	13.5
20	14.6
22	15.7
24	16.8
26	17.8
28	18.8
30	19.8
32	20.7
34	21.6
36	22.5
38	23.3
40	24.2

If you do not have a measuring tape marked in tenths of inches, the readings can be changed to 1/16" by the relation:

$$\text{measurement in 1/16" units} = \frac{\text{measurement in tenths}}{0.063}$$

For the 12-inch DBH mark, the distance from the zero end of the stick is 9.7 inches, or 9 11/16 inches.

Here's how to use the scale stick to determine the tree's diameter (refer to Figures 5 and 6). If you are using a purchased scale stick that has both tree and log scales on it, make sure you use the tree scale for both the diameter and height measurements:

1. Determine where 4 1/2 feet above ground hits you. Face the tree and center yourself on its trunk. Move up against the tree to determine where the 4 1/2 foot mark is on the tree's trunk. Hold the scale stick horizontally against the tree on tbe 4 1/2 foot mark and back away from the tree the length of your reach (the eye-to-stick distance you used to calibrated your stick). Purchased scale sticks are normally calibrated for a 25 inch reach.

2. Look directly at the center of the trunk. Without rnoving your head, shift your eyes to the left side of the tree trunk and line the zero end of the scale stick up with the left edge of the tree.

3. Without moving your head, shift your eyes to the right side of the tree and observe where the tree's right side intercepts the stick. This is the diameter measurement.

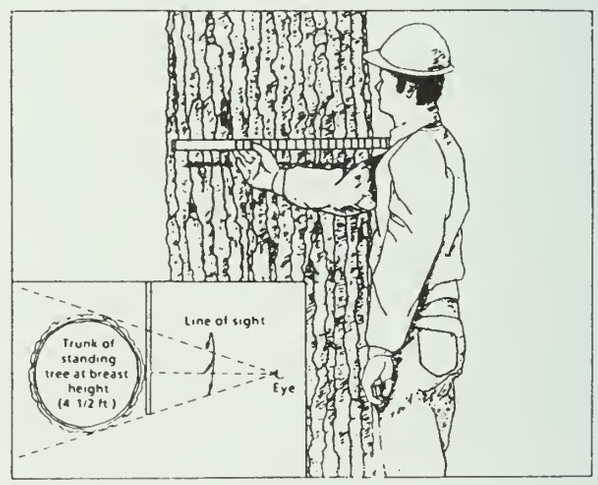


Figure 5. How to use the scale stick to measure diameter.

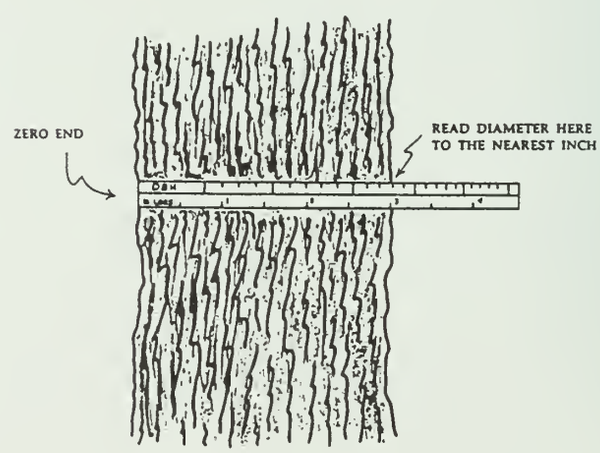


Figure 6. Reading the diameter from the stick.

4. Because trees are not round, it is good practice to take another diameter measurement one-fourth of the way around the trunk (90 degrees to your first measurement). Average the two measurements to establish the tree's diameter.

The second measurement that must be taken to determine the volume of wood in a tree is its height measurement. For simplicity sake, a tree's trunk or bole can be thought of as a series of cylinders stack on top of each other. These cylinders are logs of various lengths and diameters. The volume of each cylinder (log) is equal to the area of its circular end times the length of the cylinder. To compute a tree's board-foot volume, you will have to determine how many usable logs it contains.

Measuring a Tree's Height

Sometimes you may want to determine a tree's total height, which is the height from the ground line to the tip of its crown. Here is a simple way to take this measurement. Cut a small stick about 4 feet long. Hold the stick upright (vertical) in your hand so that the length of the stick above your hand is equal to the distance from the stick to your eye (your reach). Back away from the tree on relatively level ground, or, if on a steep slope, on the same contour as the tree until the lines of sight over your fist and the top of the stick intersect the tree's base and top, respectively (see Figure 7). The horizontal distance to the tree, which can be determined quickly by pacing, as we shall discuss later, equals the height of the tree.

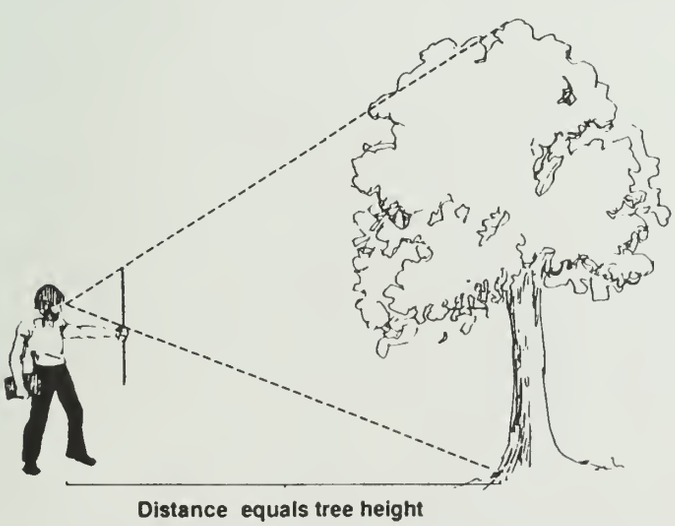


Figure 7.

This works because of similar triangles. That is, the length of the stick above your fist equals your reach so the tree's height equals the horizontal distance to the tree. This method can also be used to determine merchantable height, which will be discussed later.

Constructing a Merritt Hypsometer

The Merritt hypsometer (a "hypsometer" is an instrument used for measuring height) is found on the back or the side of most purchased scale sticks and can easily be added to the one you make. It will prove useful to mark one side in 10-foot units and the other in 16-foot log and half-log (8-foot) units (refer to Figure 8 below). The following table facilitates this calibration:

Table 2. Distances to Mark on a Meritt Hypsometer *

Reach in inches	Interval in inches to be marked on scale stick for heights of:	
	10 feet	one log (16 feet)
20	3.0	4.8
21	3.2	5.1
22	3.3	5.3
23	3.5	5.6
24	3.6	5.8
25	3.8	6.1
26	3.9	6.3
27	4.1	6.5
28	4.2	6.8
29	4.4	7.0
30	4.5	7.3

** Based on the relation I = RL/66, where I = interval in inches to be marked on the stick, R = reach in inches, and L = height unit. Note: 66 feet is the length of a surveyor's tape and is a convenient distance.*

The stick might appear as follows:

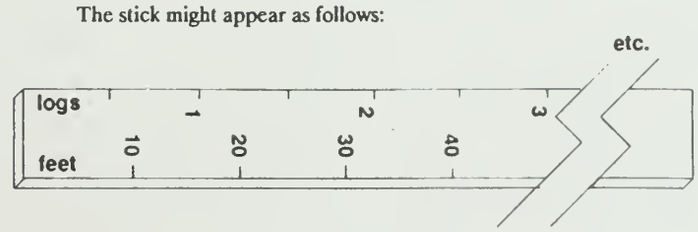


Figure 8. Markings on the Merritt hypsometer.

How the stick is used to measure height is explained later.

Measuring Distances

To determine tree height using the scale stick, a horizontal distance of 66 feet must be measured out from the base of the tree. This is done most accurately using a tape, but for many purposes pacing will suffice.

Taping

Fiberglass tapes are very durable and accurate for the distances you need to measure. A 50- or 100-foot tape is adequate and can be obtained for $20 to $30.

As we are interested in measuring horizontal distances, on steep slopes you must hold the tape high at one end (see Figure 9).

Figure 9. Using a tape to measure horizontal distance on a slope.

Pacing

Pacing is simple, fast, and accurate enough for most purposes. A pace is two steps, usually counted each time the right foot hits the ground. To determine how many feet you have per pace, measure with a tape a 66-foot distance (called a "chain") on level ground (perhaps in your lawn). (A surveyor's tape which is 66 feet long is convenient for English units; e.g., 10 square chains = 1 acre, 80 chains = 1 mile.)

Pace the 66-foot distance using a natural gait several times. You will find a consistent number of paces per chain. For example, if you have 13 paces per chain, then each pace is 66/13 or about 5 feet. There are 80 chains in a mile, so you can easily calculate the number of paces per mile.

You may have to adjust your pace if walking is difficult because of the terrain. As a rule of thumb, if you are walking up or down a moderately steep slope, count each tenth pace twice to get an approximately correct horizontal distance (see Figure 10).

Figure 10. Pacing a distance on moderate slope. Count 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 20...etc.

On steep slopes, count each fifth pace twice (see Figure 11).

Figure 11. Pacing a distance on a steep slope. Count 1, 2, 3, 4, 5, 5, 6, 7, 8, 9, 10, 10, 11, 12, 13, 14, 15, 15, 16, 17, 18, 19, 20, 20...etc.

With a little practice, you will become confident in your pacing ability and will find it is a useful skill.

Determining Merchantable Height

To determine the board-foot volume of lumber contained in a tree, you will have to determine the tree's merchantable height. Merchantable height is different than total height. Here, merchantable implies the ability to cut lumber, veneer or other products from the logs contained in the tree. There are numerous factors which make a log unusable for lumber or veneer. One is the size of the log. For economic reasons, mills that harvest sawtimber for lumber generally will not accept logs smaller than 10 inches in diameter (inside the bark) at the small end of the log.

The major factor which influences merchantable height is tree form. The first major fork in the tree is a good example. The diameter of the trunk (log) just below the fork may well exceed 10 inches, but the log(s) above the fork generally becomes quite limby and produce lower quality lumber. Large crooks, bends, or sweep in the trunk can also make this portion a cull or unusable for lumber. Noticeable swellings or decayed limbs or holes are also tell-tale signs that the inside of the trunk contains rot and would not produce sound lumber. These factors are known as defect.

In summary, merchantable height is controlled by a diameter limit in the upper part of the tree or by some defect occurring on the trunk which renders the wood above unsuitable for conversion to products. Making this determination sounds difficult, but with a little practice you can quickly assess where the merchantable height is on each tree.

Using the Merritt Hypsometer to Determine Merchantable Height

The Merritt hypsometer is used to determine merchantable height in 16-foot logs. Half-logs are 8 feet in length. You calibrated your stick to read log heights when you stand 66 feet away from the base of the tree. You'll need a 50- or 100-foot tape or be able to pace the distance accurately (refer to Figures 12 and 13).

1. Begin by observing the tree on all sides for outward signs of defect. Decide where merchantable height will be measured.

2. Move 66 feet away from the tree in a direction that will give you an unobstructed view of the merchantable height point on the trunk and the base of the tree. This may be difficult in a woodland with dense undergrowth. You should pay particular attention that you pace or measure the 66-foot distance along the contour so that you remain at the same level as the base of the tree. Standing above or below the base of the tree on a hill rather than along the contour can lead to wrong height measurements.

3. Prior to moving away from the tree, lean a clipboard with an attached piece of white notebook paper up against the base of the tree. The white paper will help give you a target when sighting the tree's base from 66 feet.

4. Once you reach 66 feet, turn and face the tree. Hold the stick away from you at your reach distance. Make sure the Merritt hypsometer side is facing you. It is important that the stick be held vertical. Allowing the stick to lean toward or away from you can cause measurement errors. Hold the stick so the base or zero end lines up with the top of the clipboard. Height measurements are always made with a one-foot stump height allowance. The clipboard represents this stump height allowance. Generally, loggers will not cut the tree flush with the ground and normally leave a stump approximately one foot high or less. Stumps higher than one foot indicate a waste of wood and careless cutting practices.

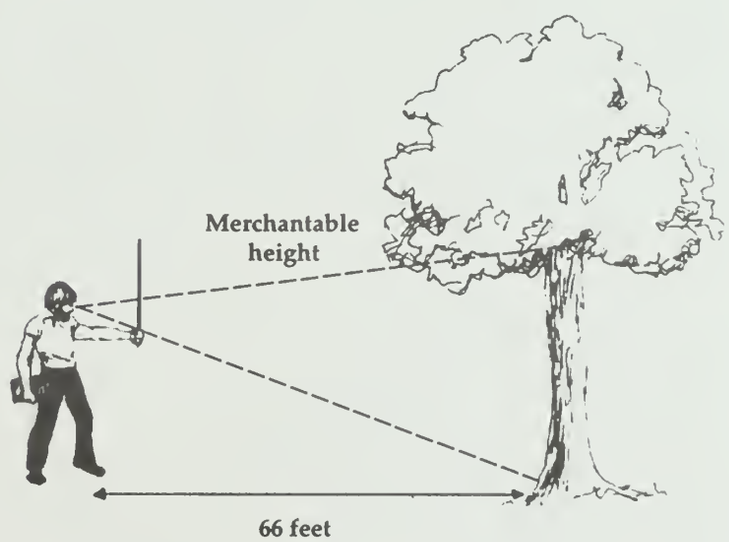


Figure 12. Measuring merchantable height with the Merritt hypsometer.

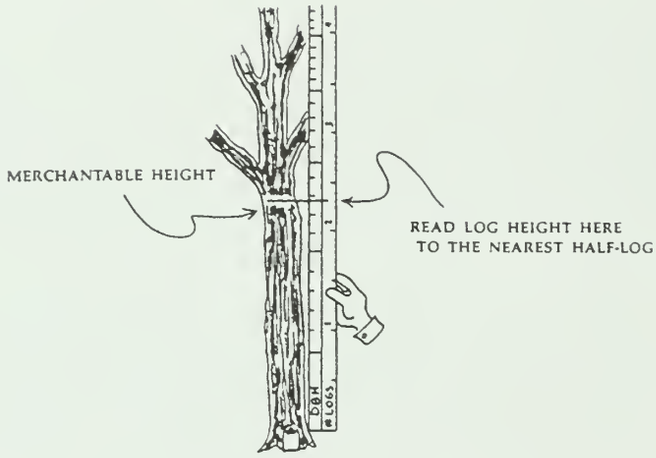


Figure 13. Reading merchantable height on the scale stick.

5. Without moving your head, shift your eyes up to the point on the trunk where you've determined merchantable height will be measured. Observe where this point intercepts the stick. Read the number of 16-foot logs directly from the stick. Merchantable height should be measured to nearest half-log.

With these two measurements, diameter and log height, you can determine the board-foot volume of the tree using the volume table included in this newsletter. A discussion on how to use the volume table is presented later.

Board Feet

A board-foot is a unit of measure common to the United States. It is simply the amount of wood in a piece measuring 12 inches square and one inch thick.

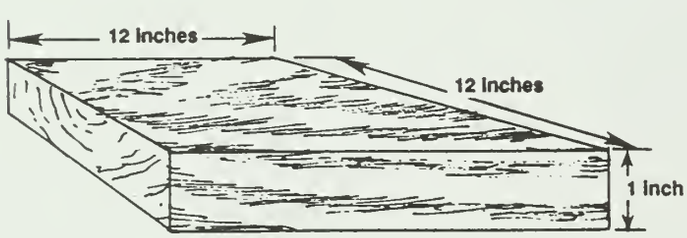


Figure 14. One Board-Foot of Wood.

Thus, a board-foot equals 1 x 12 x 12 = 144 cubic inches. This fact makes it easy to calculate the number of board feet in lumber of any size. For example, a 2"x4" which is 8 feet long has

$$\frac{(8\text{ ft.}) \times (12\text{ in./ft.}) \times (2) \times (4)}{144} = 5.3 \text{ board feet}$$

Perhaps an easier method is to multiply the length of the piece in feet times width and thickness in inches, and divide the answer by 12.

$$\frac{(8\text{ ft.}) \times (2) \times (4)}{12} = 5.3 \text{ board feet}$$

The board-foot measure actually indicates the size of the board before it is planed. As woodworkers and builders recognize, a board sold as 10 inches wide and 1 inch thick is actually less than those dimensions due to the processing that occurred after it was sawed from the log.

Volume Table

A volume table reveals the volume of wood contained in trees of different diameters and log lengths. There are many different types of volume tables used to compute wood volume in trees, however, we will concern ourselves only with the volume table base on the Doyle Log Rule since this is the rule used by foresteres and timbers buyers in Illinois to scale timber and logs (refer to the volume table on the next page).

A volume table is easy to use. Read along the left side of the table to find the correct diameter and across the top to find the number of 16-foot logs. The nurnber where the column and row intersect is the board-foot volume of the tree.

This volume estimate assumes the logs were 100 percent sound. You must make an allowance for the defect you have in your woodland. It is unlikely for a young, vigorous woodland to have much rot and decay in the trees, whereas an over-mature woodland may have many large trees with hollow centers. A forester can help you learn how to assess the amount of defect in your woodland.

Once you have adjusted your board-foot volume figure for defect, you can begin to rnake a determination of what the trees in your woodland might be worth. You will need to know whether the trees (logs) are veneer or sawtimber grade.

Gross volume of tree, Doyle Log Rule, Form Class 78.

	Merchantable height in number of 16-foot logs										
DBH	1	1 ½	2	2 ½	3	3 ½	4	4 ½	5	5 ½	6
In.	Volume in board feet										
10	14	17	20	21	22	-	-	-	-	-	-
11	22	27	32	35	38	-	-	-	-	-	-
12	29	36	43	48	53	54	56	-	-	-	-
13	38	48	59	66	73	76	80	-	-	-	-
14	48	62	75	84	93	98	103	-	-	-	-
15	60	78	96	108	121	128	136	-	-	-	-
16	72	94	116	132	149	160	170	-	-	-	-
17	86	113	140	161	182	196	209	-	-	-	-
18	100	132	164	190	215	232	248	-	-	-	-
19	118	156	195	225	256	276	297	-	-	-	-
20	135	180	225	261	297	322	346	364	383	-	-
21	154	207	260	302	344	374	404	428	452	-	-
22	174	234	295	344	392	427	462	492	521	-	-
23	195	264	332	388	444	483	522	558	594	-	-
24	216	293	370	433	496	539	582	625	668	-	-
25	241	328	414	486	558	609	660	709	758	-	-
26	266	362	459	539	619	678	737	793	849	-	-
27	292	398	505	594	684	749	814	877	940	-	-
28	317	434	551	651	750	820	890	961	1032	1096	1161
29	346	475	604	714	824	902	980	1061	1142	1218	1294
30	376	517	658	778	898	984	1069	1160	1251	1339	1427
31	408	562	717	850	983	1080	1176	1273	1370	1470	1570
32	441	608	776	922	1068	1176	1283	1386	1488	1600	1712
33	474	654	835	994	1152	1268	1385	1497	1609	1734	1858
34	506	700	894	1064	1235	1361	1487	1608	1730	1866	2003
35	544	754	964	1149	1334	1472	1610	1743	1876	2020	2163
36	581	808	1035	1234	1434	1583	1732	1878	2023	2173	2323
37	618	860	1102	1318	1534	1694	1854	2013	2172	2332	2492
38	655	912	1170	1402	1635	1805	1975	2148	2322	2491	2660
39	698	974	1250	1498	1746	1932	2118	2298	2479	2662	2844
40	740	1035	1330	1594	1858	2059	2260	2448	2636	2832	3027

Source: Mesavage and Girard, 1956. Tables for Estimating Board-foot Volume of Timber, U.S. Department of Agriculture, U.S. Forest Service.

There is a dramatic difference in the price per board foot between the two. Again, you meet with your forester and he/she can point out the characteristics that distinguish a veneer quality tree (log) from one that will be harvested for lumber (sawtimber). With practice, you will be able to make this determination on the trees on your property. In most cases, the majority of your timber will be harvested for sawtimber. It is a rare case where most of the timber is veneer-quality. Knowing how to distinguish the difference, however, will result in higher returns for you should you decide to sell some of your timber.

Let's assume you have measured a white oak tree and determined it has a volume of 433 board-feet (24 inch diameter

and 2 1/2, 16-foot logs with no defect).

On page 11-12 of this newsletter you will find the most recent Illinois Timber Prices reporting sheet. Notice the state is divided up into three zones. Find the zone appropriate for your woodland. The individual species prices quoted on the first page are state-wide average sawtimber prices per thousand board-feet of lumber. On page 12 are price ranges paid for sawtimber by species within each zone. Sawtimber refers to logs that are cut into lumber or timbers. Stumpage price is the amount paid for standing timber, normally what you would receive. F.O.B. price is what you would receive for the logs delivered to the mill.

In the above example, the 433 board-foot white oak would be worth $86.60 (stumpage) based on state-wide averages for sawtimber. This figure should be used only as a guide. As pointed out in the reporting sheet, general market and economic conditions are the major price-determining factor. If you have only one tree to sell, it is highly unlikely you would attract any interest from timber buyers, particularly if the tree is growing in or near a residence.

Notice the increase in price paid for face veneer. Face veneer is logs cut into thin sheets of veneer used mostly in furniture manufacturing. If the white oak in the example had one, 16-foot veneer butt log, the tree could be worth $151.90 to $410.60 based on the statewide price range for white oak face veneer.

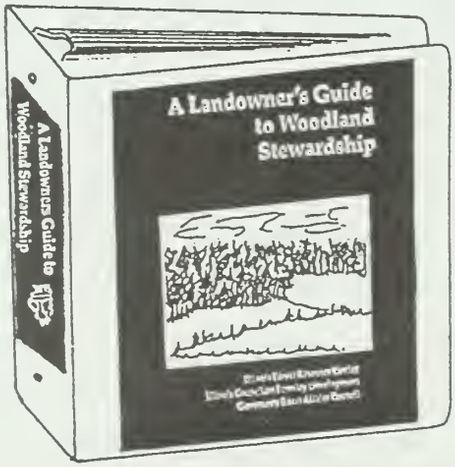
If you're considering a timber sale in the not-to-distant future, we strongly suggest you have a professional forester assist you. Contact the newsletter editor for more information about Illinois foresters and the services they provide. Also, if you decide to purchase a scale stick, make sure it is one that has the Doyle Rule printed on it.

This article and illustrations were adapted, in part, from **How to Estimate the Value of Timber in Your Woodlot** by Harry V. Wiant, Jr., Circular 148. West Virginia University Agricultural and Forestry Experiment Station, Morgantown, WV; 1989.

Selected illustrations also came from **Timber Management For Small Woodlands**, Goff, Gary R., et al. Information Bulletin 180. Cornell Cooperative Extension Service, Ithaca, NY.

Available from the Illinois Forest Resource Center...

A Landowner's Guide to Woodland Stewardship



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Alternative Income Opportunities (including) timber production, black walnut, christmas trees, firewood, ginseng, maple syrup, nuts, paulownia, recreation enterprises, and shiitake mushrooms

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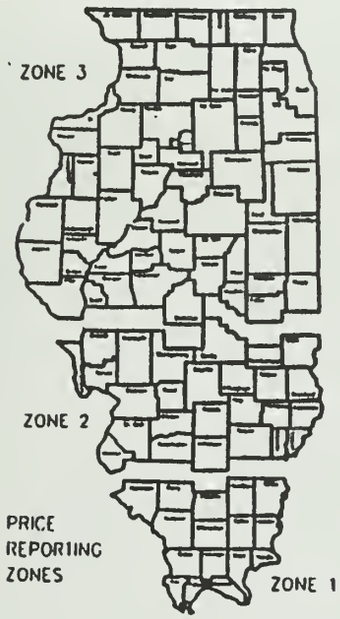
ILLINOIS TIMBER PRICES

ILLINOIS
U.S. DEPARTMENT OF AGRICULTURE
ILLINOIS DEPARTMENT OF AGRICULTURE
P.O. Box 19283, Springfield, IL 62794-9283
Phone: (217) 492-4295
AGRICULTURAL STATISTICS SERVICE

DIVISION OF FOREST RESOURCES
600 North Grand Avenue West
Springfield, Illinois 62706
Phone: (217) 782-2361
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

June 10, 1997



PRICES PAID ILLINOIS TIMBER PRODUCERS NOVEMBER 1996 THROUGH FEBRUARY 1997

Winter sawtimber prices paid to Illinois timber growers showed no clear upward or downward trend for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1996 operations, 38% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Natural Resources, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	November 1995-February 1996		May 1996-August 1996		November 1996 - February 1997	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	185	330	170	340	170	300
Basswood	105	200	100	230	95	190
Beech	60	170	80	180	70	180
Cottonwood	45	145	50	150	40	140
Sweet Gum	70	150	85	170	85	170
Elm & Hackberry	65	145	60	150	60	140
Hickory	70	175	80	160	65	170
Soft Maple	85	210	95	210	95	170
Sugar Maple	115	260	120	190	140	300
Black Oak	160	330	160	270	150	250
Pin Oak	65	160	65	160	60	160
Red Oak	235	395	230	390	220	385
White Oak	235	390	220	390	200	340
Yellow Poplar	130	250	120	350	120	280
Sycamore	60	160	70	150	60	160
Black Walnut	360	550	320	510	330	510
Woods Run Bottomland	90	200	85	190	80	180
Woods Run Upland	140	310	110	300	140	270

FACE VENEER - $ PER M BD. FT.

Red Oak	585	980	600	950	510	730
White Oak	950	1,610	1,000	1,800	1,100	1,900
Walnut	1,650	2,010	1,600	2,000	1,490	2,100

COOPERAGE - $ PER M BD. FT.

White Oak	240	415	280	600	250	430

UNPEELED PULPWOOD - $ PER TON

Ton	2.00	17.95	1.50	16.80	2.10	17.25

Timber Prices
November 1996-February 1997
June 10, 1997

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
November 1996 - February 1997

PRODUCT	UNIT	Zone 1 Stumpage	Zone 1 F.O.B. Mill	Zone 2 Stumpage	Zone 2 F.O.B. Mill	Zone 3 Stumpage	Zone 3 F.O.B. Mill
				Dollars			
1. Sawtimber							
Ash	M bd. ft.	100 - 250	200 - 400	100 - 250	200 - 400	90 - 250	200 - 400
Basswood	M bd. ft.	50 - 120	140 - 210	50 - 120	140 - 220	60 - 120	140 - 220
Beech	M bd. ft.	70 - 90	150 - 200	40 - 80	150 - 200	60 - 100	150 - 200
Cottonwood	M bd. ft.	30 - 60	130 - 150	20 - 80	120 - 140	20 - 60	120 - 140
Sweet Gum	M bd. ft.	70 - 100	120 - 200	80 - 140	NA	70 - 100	120 - 200
Elm & Hackberry	M bd. ft.	30 - 100	120 - 140	40 - 60	120 - 180	25 - 80	120 - 180
Hickory	M bd. ft.	60 - 90	120 - 180	50 - 100	120 - 180	50 - 80	150 - 210
Soft Maple	M bd. ft.	60 - 100	120 - 250	60 - 120	150 - 200	60 - 140	140 - 260
Sugar Maple	M bd. ft.	100 - 150	200 - 400	100 - 200	150 - 400	80 - 200	250 - 350
Black Oak	M bd. ft.	80 - 200	200 - 350	100 - 230	200 - 350	100 - 250	190 - 350
Pin Oak	M bd. ft.	30 - 70	140 - 170	30 - 80	150 - 180	50 - 100	150 - 180
Red Oak	M bd. ft.	100 - 320	250 - 400	100 - 300	250 - 500	150 - 300	300 - 450
White Oak	M bd. ft.	160 - 300	250 - 450	150 - 300	250 - 550	150 - 300	300 - 450
Yellow Poplar	M bd. ft.	100 - 150	230 - 300	100 - 140	230 - 300	80 150	NA
Sycamore	M bd. ft.	30 - 90	120 - 170	50 - 70	130 - 180	35 - 80	120 - 180
Black Walnut	M bd. ft.	200 - 400	400 - 600	200 - 350	400 - 550	200 - 400	450 - 650
Woods Run Bottomland	M bd. ft.	70 - 100	170 - 200	60 - 100	140 - 210	50 - 100	150 200
Woods Run Upland	M bd. ft.	70 - 150	170 - 300	60 - 200	150 - 300	95 - 150	200 300

		STATEWIDE Stumpage	STATEWIDE F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	200 - 800	400 - 1,000
White Oak	M bd. ft.	500 - 1,700	1,600 - 2,100
Walnut	M bd. ft.	800 - 1,800	1,400 - 4,000
3. Cooperage			
White Oak	M bd. ft.	150 - 400	400 - 500
4. Pulpwood			
Unpeeled	Ton	2.00 - 4.00	16.50 - 20.00

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	100
Scribner	0
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	20	100 - 180
Zone 2	14	100 - 150
Zone 3	13	100 - 200
ILLINOIS	47	100 - 200

VOLUME OF 1996 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	17	29	46	31
100 - 500	25	36	31	31
500 - 1,000	25	-	-	10
1,000 - 3,000	17	28	8	20
3,000 +	16	7	15	8

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - NOVEMBER 1996 - FEBRUARY 1997

	STATEWIDE STUMPAGE*
Woods Run Upland	$119-$356/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

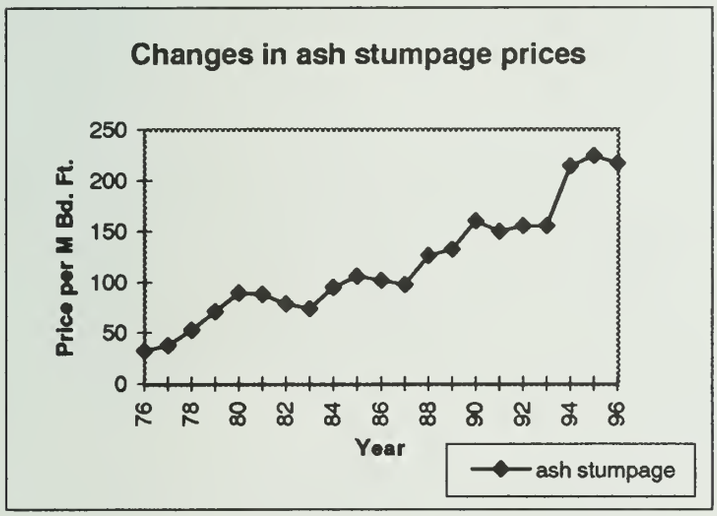
Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

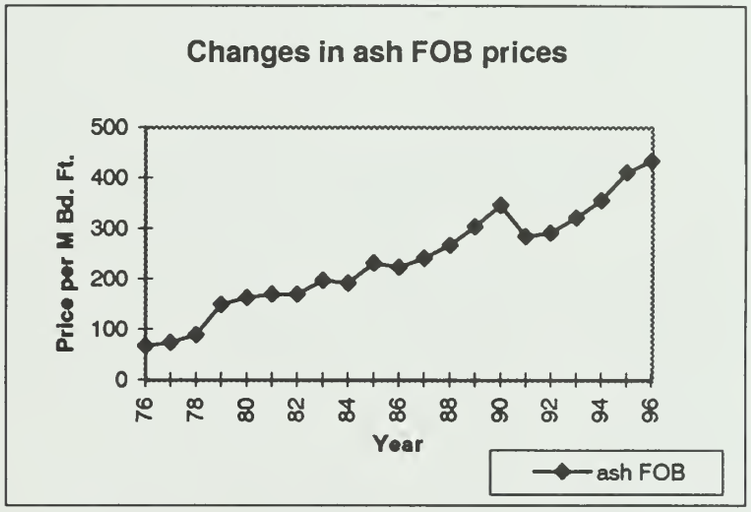
"Printed by authority of the State of Illinois," 6/10/97, 1,700, 1039

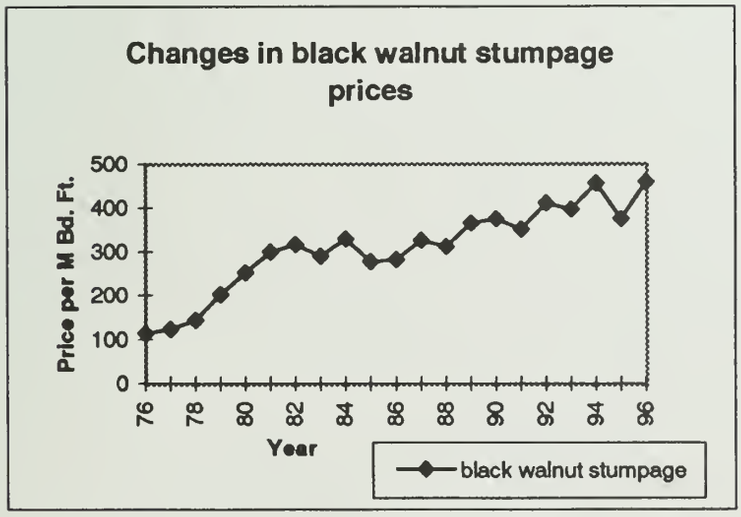
ILLINOIS SAWTIMBER AND FACE VENEER PRICE TRENDS FOR SELECTED SPECIES—1976-1996

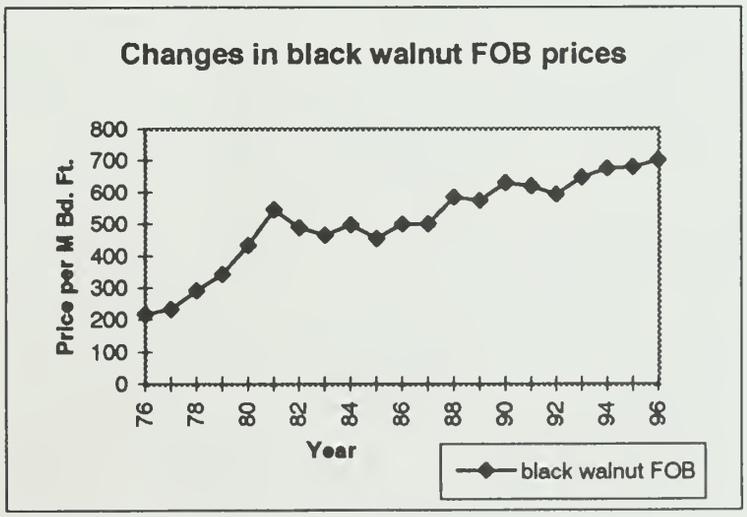
Illustrated on pages 13-15 are Illinois sawtimber and face veneer price trends for selected species for a 20 year period from 1976 to 1996 as reported in the Illinois Timber Prices reporting sheet. The prices reflect the price paid per 1,000 board feet (M. Bd. Ft.) and have been adjusted to 1982 dollar equivalents using the Producer Price Index. For sawtimber, ash, black walnut, red oak, white oak, and sugar maple prices are illustrated. Face veneer prices are for black walnut, red oak and white oak. Both stumpage and FOB prices are presented. Stumpage is the price paid for standing timber. FOB is the price paid for logs delivered to the mill. The prices reported in Illinois Timber Prices are statewide averages and are considered conservative.

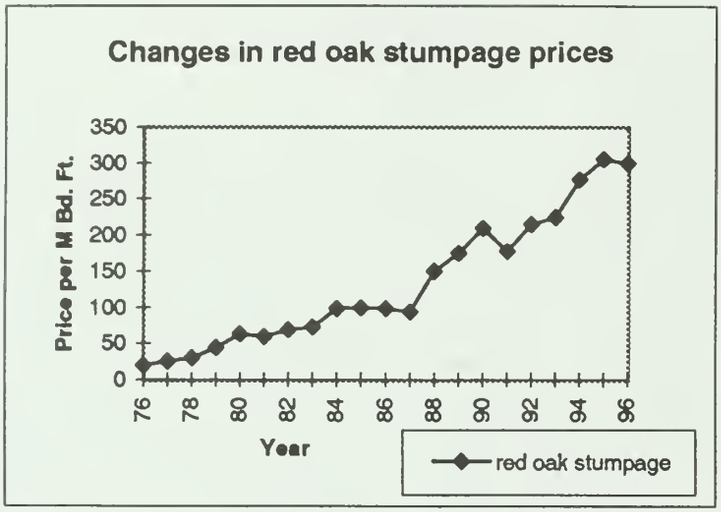
Sawtimber Prices

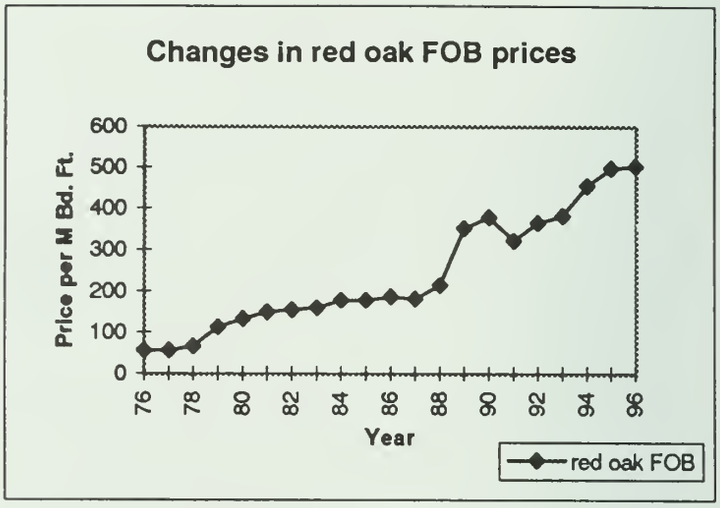


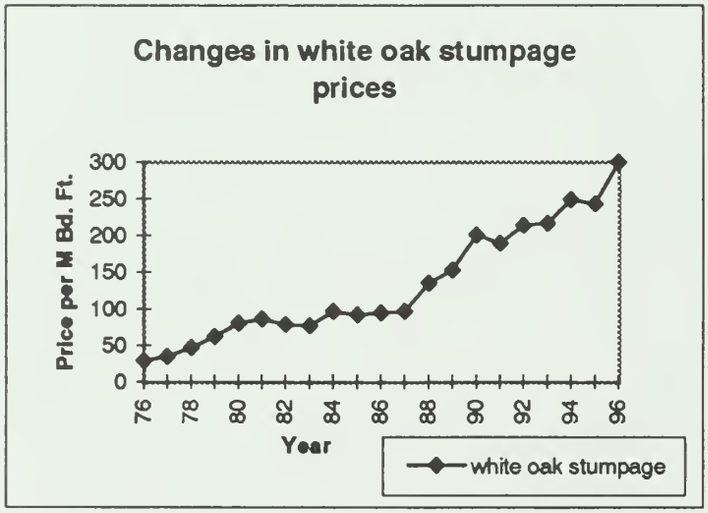


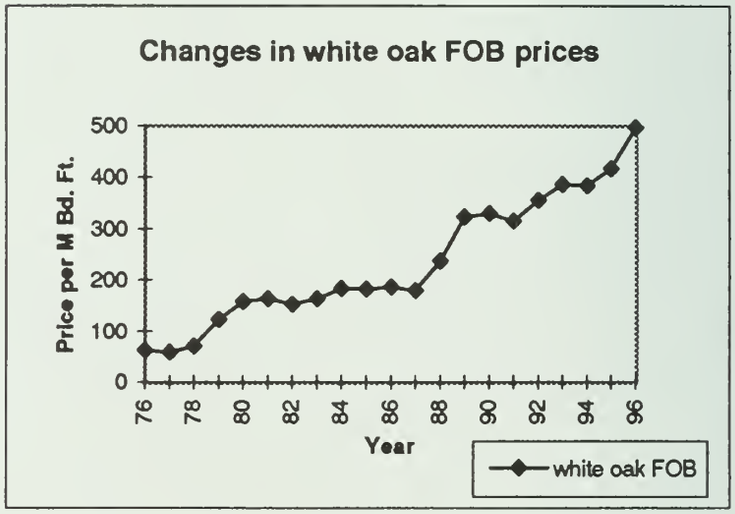


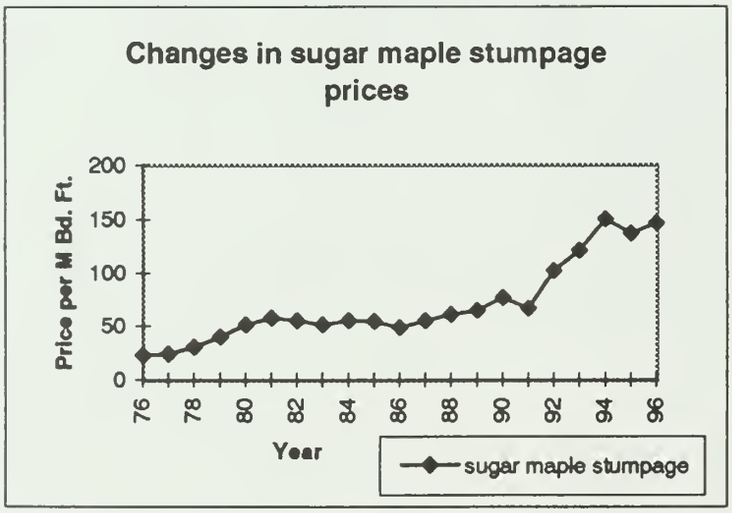



Changes in red oak stumpage prices
Price per M Bd. Ft.
350
300
250
200
150
100
50
0
76
78
80
82
84
86
88
90
92
94
96
Year
red oak stumpage


Changes in red oak FOB prices
Price per M Bd. Ft.
600
500
400
300
200
100
0
76
78
80
82
84
86
88
90
92
94
96
Year
red oak FOB


Changes in white oak stumpage prices
Price per M Bd. Ft.
300
250
200
150
100
50
0
76
78
80
82
84
86
88
90
92
94
96
Year
white oak stumpage


Changes in white oak FOB prices
Price per M Bd. Ft.
500
400
300
200
100
0
76
78
80
82
84
86
88
90
92
94
96
Year
white oak FOB


Changes in sugar maple stumpage prices
Price per M Bd. Ft.
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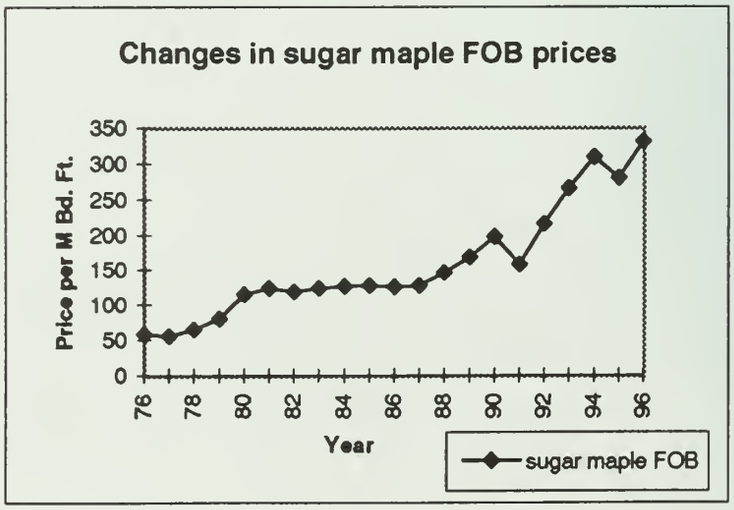
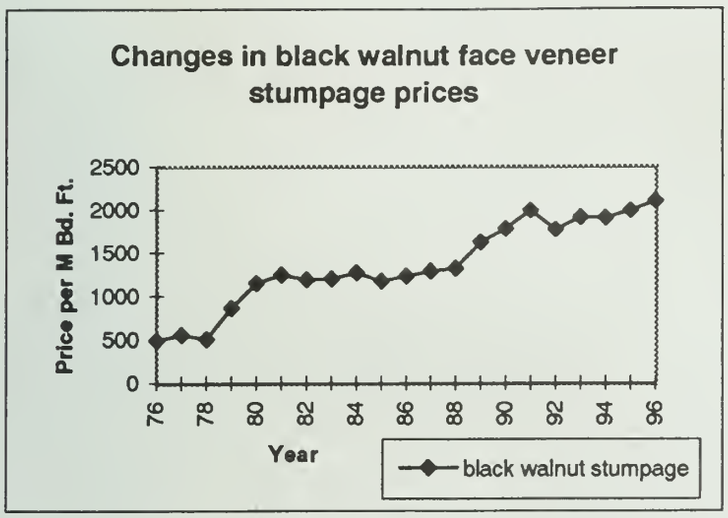
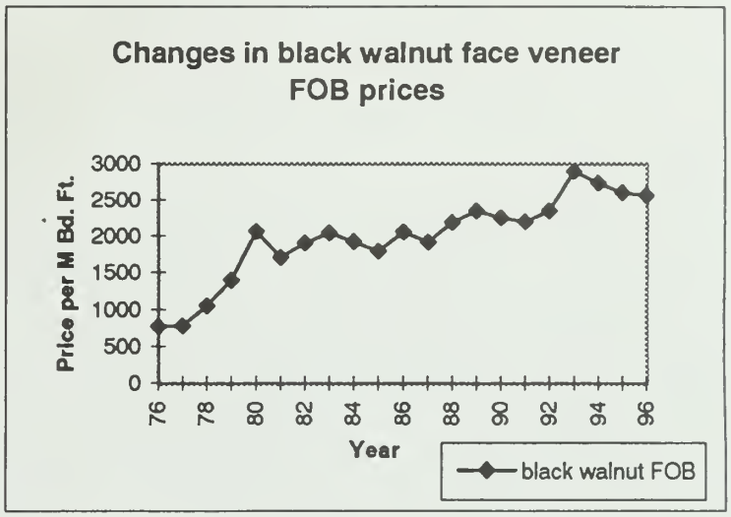
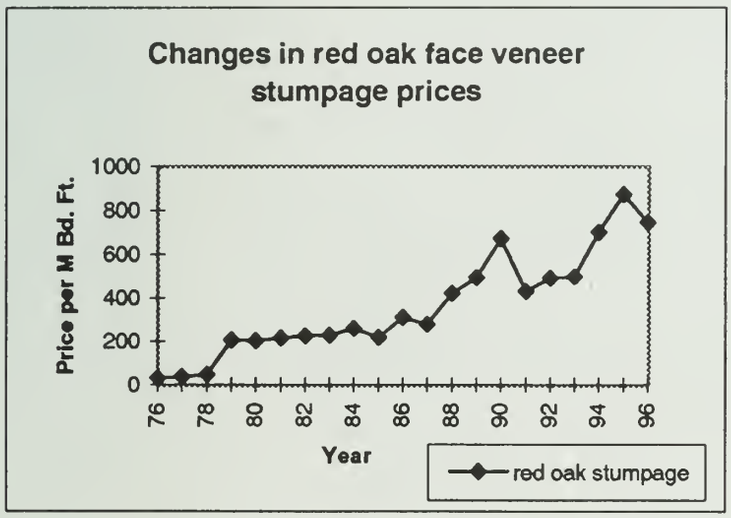
150
100
50
0
76
78
80
82
84
86
88
90
92
94
96
Year
sugar maple stumpage

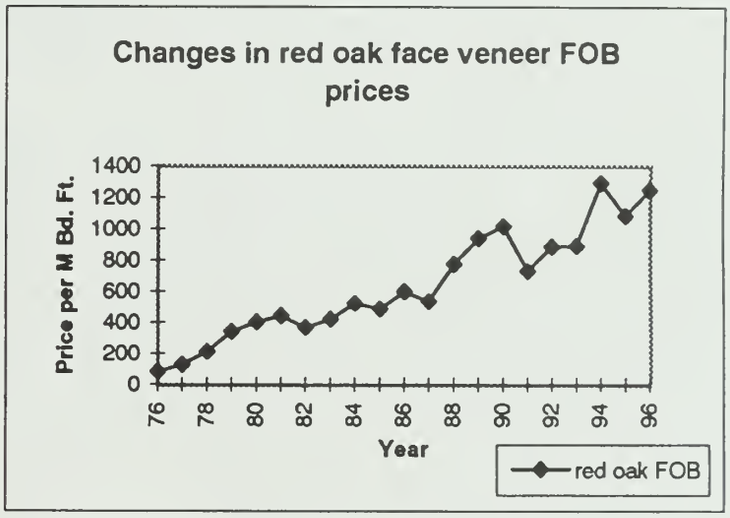

Changes in sugar maple FOB prices
Price per M Bd. Ft.
350
300
250
200
150
100
50
0
76
78
80
82
84
86
88
90
92
94
96
Year
sugar maple FOB

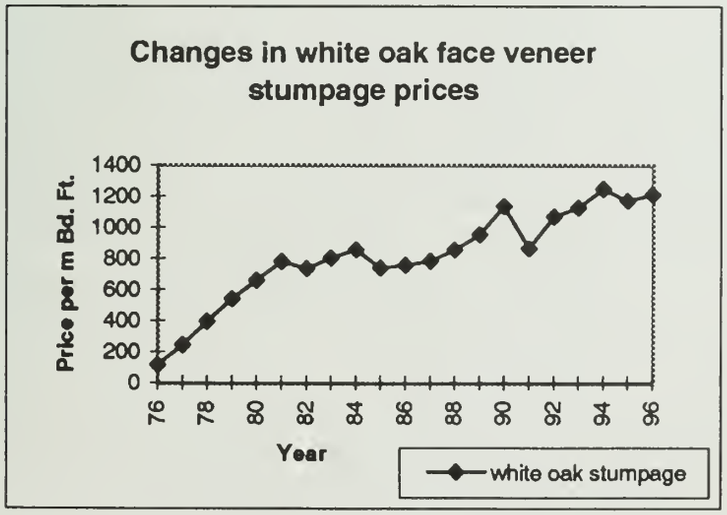
Face Veneer Prices

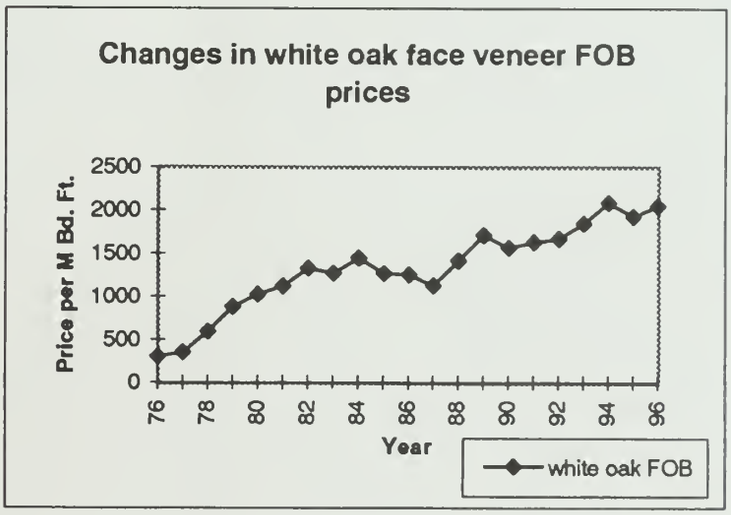












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ILLINOIS FOREST MANAGEMENT

A Biannual Newsletter for Illinois Landowners

Volume 2, 1997 No. 33

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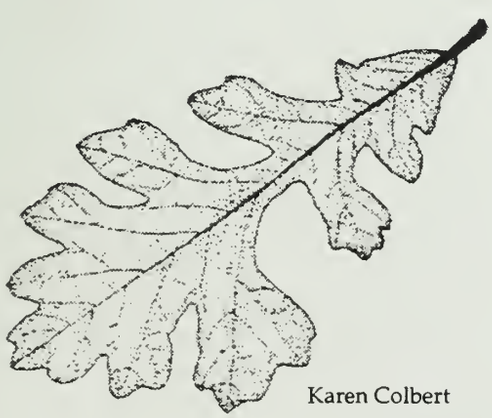

Karen Colbert

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Agroforestry—Trees That Work For Illinois

by Tom Ward, NRCS agroforester

Agroforestry is an intensive land management system that deliberately combines trees or shrubs with crops or livestock and makes the most of the biological interactions that result. If turning farmers and foresters into agroforesters requires a stretch of your imagination, get ready to do some stretching. There are several ways to strategically add trees and shrubs to the typical Illinois farm operation and several good reasons for doing it. The most common agroforestry practices are windbreaks, alley-cropping, riparian forest buffers, silvopasturing, and forest farming. Potential benefits include diversifying and enhancing the farm economy, conserving soil, improving water quality, saving energy, creating wildlife habitat, and improving the appearance of the landscape. The most important benefit for some producers is that agroforestry can put money in their pockets. Land that is unsuited to row crops continues to generate an annual income as it is being converted to a permanent cover crop.

Windbreaks Work

Windbreaks are the most common North American agroforestry practice. Farmstead windbreaks protect and beautify homes, cut heating costs, control dust in summer and drifting snow in winter, and make work areas more comfortable. Homeowners who use windbreaks can realize energy savings of 10 to 40%—with savings greatest for older homes that are less airtight, especially if they are in exposed northern prairielike landscapes.

Windbreaks help reduce noise from highways and grain-drying equipment. Well-designed plantings—with a minimum of three rows of trees—can cause noise reductions of 10 to 20 decibels. Windbreaks often reduce home maintenance costs because less wind damage occurs, and they have been shown to increase property value by 6 to 12%. Living snowfences—rows of strategically placed trees and shrubs—trap blowing snow and keep roads and work areas free of drifts. Especially in the northern parts of the state, these windbreaks can greatly reduce the time and fuel used in plowing snow.

Field windbreaks increase yields by reducing soil erosion and protecting crops from wind damage. The trees also create the sort of sheltering, warm environment found in a greenhouse. Crops suffer less from wind stress, the soil retains moisture because the wind doesn't dry it out as much, and trapped snow drifts melt and contribute their moisture to the field. In the Great Plains, farm operator with field windbreaks consistently report crop yield increases of 6 to 44%—from 10 to 12% for corn, from 13 to 20% for soybeans, and up to 23% for winter wheat. The data for corn is particularly convincing because we have so much information and it comes from a variety of locations. These yield increases, however, are based on yield for the entire field. The first few rows behind a windbreak show a decline in yield because the crop is competing with the trees, but yields in the rest of the field more than make up for these small losses.

All windbreaks provide scenic beauty and habitat for wildlife. With careful species selection, windbreaks can also be a source of income. Nut-producing trees of shrubs, such as walnut, pecan, chestnut, or hazelnut, can provide an annual crop for people or wildlife. Fine quality hardwoods, such as oak, ash, or cherry, can eventually provide sawlogs or veneer logs. Sugar maple can provide a source of syrup, and flowering trees and shrubs such as basswood provide forage for honeybees.

Alley-Cropping

Alley-cropping means alternating rows of trees and "alleys" of farmland that are 40 to 60 feet wide. Alleys must be at least wide enough to accommodate all the necessary farm equipment. This agroforestry practice combines the long-term benefits of trees with the annual income of row or forage crops. It reduces soil erosion by wind and water, increases sediment deposits and rainfall infiltration, and improves water quality. Rows of trees provide wildlife cover and travel corridors while adding natural beauty and diversity to the landscape.

Like windbreaks, alley-cropping increases short-term crop yields by creating a greenhouse effect between the tree rows. Many high-quality hardwood trees in Illinois are suitable for alley-cropping. Black walnut is a popular choice for alley-cropping because its deep rooting characteristics, open canopy, and short growing season limit competition between trees and crops. Because there are markets for both its wood and its nuts, black walnut has been one of Illinois' most commercially valuable trees. Other options for trees rows include nut-producing trees such as pecan and blight-resistant chestnut or high-value hardwoods such as oak and ash. Crop options for the farmed alleys include corn, soybeans, winter wheat, and forage crops.

Will annual cropping continue indefinitely? Or will the tract become a tree plantation as the canopy closes and shades out the alleys? This decision will determine the width between the tree rows and the particular tree-crop combination the producer uses. As the trees grow in size, lower light levels will dictate a change in the crop grown in the alley. Nut production from walnut, pecan, or chestnut trees can replace row crops in providing an annual income. If a timber plantation is the ultimate goal, several years of row-crop and forage-crop income can more than cover the costs of establishing a tree plantation. Cropped alleys can finally be used for short-term rotational grazing.

Riparian Forest Buffers

Riparian forest buffers—timber that borders on streams, lakes, ponds, wetlands, and ditches—are a valuable agroforestry practice. The duff (litter) layer in forests helps to increase infiltration of water into the soil profile below. This litter layer is particularly important during heavy rainfall because it helps trap water that would otherwise run off the soil surface, carrying soil particles with it into nearby streams, ponds, or drainageways. Riparian buffers also protect water quality by trapping sediment and agricultural chemicals, which are taken up by the vegetation in the buffer. Increased water spreading and sediment deposition can be obtained by using grass filter strips as a transition between the forested zone and adjoining land, which is likely to be a field of corn or soybeans.

Because the essential elements of habitat, water, food, and cover are all available, riparian forests are among the most

valuable wildlife habitats in Illinois. Long, narrow riparian forests maximize the amount of "edge" habitat between forest and water or farmland. As a result, these forests have long wildlife travel corridors that connect them with many other forested areas and greatly expand the area that is available to wildlife.

Plantations of high-quality bottomland hardwoods combined with riparian shrubs and grass filter strips can provide a variety of economic opportunities. Agroforestry can obtain income from timber, nut, horticultural, and forage products. Recreational development and fee hunting are also possibilities.

Silvopastoral Systems

Any combination of trees with forage crops, either hay or pasture, is called a silvopastoral system. A properly designed and managed system can optimize production of both cool-season grasses and timber. The landowner's goals and objective will determine what kind of trees and forage are selected, the spacing that is used, and how livestock are managed. Fencing to allow rotational grazing is necessary to make this system work. Silvopastoral systems are most common in pine plantations in the southern and western United States. Intensive grazing systems in black walnut and pecan plantations have been successful in Missouri. Of all the agroforestry practices, silvopasturing require the most sensitive and complex management. Trees must be thinned at regular intervals so that enough light can reach the forest floor to support good crops of grass. Livestock use must be carefully managed to prevent damage to trees, overgrazing, and soil compaction. Grazing of a native woodland is generally not an acceptable practice in traditional hardwood forest management because of site degradation and grazing damage to young seedlings and other ground cover.

Forest Farming

When an existing forest stand is manipulated to add a specialty crop, the result is called forest farming. Examples of crops include maple syrup, medicinal plants such as ginseng and goldenseal, craft materials such as wreath materials and pine cones, shiitake and morel mushrooms, native fruit such as persimmon and paw-paw, and nuts such as pecans, walnuts, and hazelnuts. Parts of a farm that were once just woodlots, yielding forest products periodically, can become part of an active farming operation, yielding annual crops of food, medicinals, or craft materials.

Agroforestry: An Opportunity and a Challenge

Some landowners practice agroforestry simply because it is good for conservation, good for wildlife, and more pleasing to the eye than traditional agriculture. The economic benefits of agroforestry, however, must ultimately drive its widespread adoption. Some persons wonder how tree planting can compete with corn and soybeans on the Illinois landscape, especially when farm commodity prices are high. It's because agroforestry makes sense from an economic point of view.

Often trees are planted on lands less suitable to row crops or in odd-shaped or hard-to-work areas. Riparian forest buffers are planted on floodplain fields that cannot be farmed profitably due to wetness or flooding. Strategically located, narrow windbreaks increase yields in adjacent fields, more than making up for the small amount of land taken out of production. Agroforestry seeks to make every tree that's planted a "working tree" by carefully selecting the species and location in which it is planted. Every tree should yield a saleable product—or increase yields or reduce costs in adjacent crops (it may do both). The other benefits derived from agroforestry are simply an enormous bonus.

Agroforestry gives landowners the opportunity to develop a portfolio of short- and long-term investments, allowing them to reduce their risk through diversification. It is particularly promising for farmers with land that is unsuitable for crop production due to high soil erosion or flood risk, providing a cost-effective way of removing it from crop production over time. Perhaps the greatest risk and challenge in adopting agroforestry systems is developing local markets for new products such as nuts, horticultural materials, small wood products, and wood chips. It may not be the way your parents farmed. But if your have an entrepreneur's drive, imagination, and determined nature, you could succeed with agroforestry.

Tom Ward is an agroforester for the Natural Resources Conservation Service, U.S. Department of Agriculture in Champaign, IL.

This article is reprinted with permission from *The Illinois Steward* magazine, Volume 6, No. 4, Winter 1998.

Proper Planning Critical To Enjoying Benefits of New Tax Law

by William C. Siegel

The Taxpayer Relief Act of 1997, signed by President Clinton on August 5, provides $152 billion in tax cuts between now and 2002. Although the new legislation contains more than 100 tax reduction provisions, most of the benefits are attributable to only five of these. They are the child credit, expanded individual retirement accounts (IRAs), educational tax incentives, estate tax relief and a reduction in long-term capital gain rates.

Even though the new law represents the first significant tax cut since 1981, its scope as a whole is rather insignificant when compared with the massive tax reductions that marked the beginning of the Reagan administration. In inflation adjusted dollars, the 1981 tax cuts were more than 15 times larger.

For those who are concerned about the complexity of the U.S. tax system, the Act does little to lessen that concern. The new provisions are anything but simple, for the most part, and add several layers of complexity to the Internal Revenue Code. In turn, they will spawn what promises to be equally complex sets of regulations, and new or significantly revised tax forms. As a result, the public call for sweeping tax reform could well be revived.

Nevertheless, there is good news for most nonindustrial woodland owners with respect to capital gains from timber sales, and estate tax relief. Additionally, certain other changes will be of benefit to smaller groups of timber owners .

Capital Gains Relief

The first rate cut for long-term capital gains since 1981 applies only to noncorporate taxpayers (individuals, estates and trusts)—not to corporate taxpayers. The new lower rates do apply, however, to individuals who receive pass-through income from Subchapter S corporations and partnerships. A three tier approach, with six different rates, applies to the sale of most capital assets including timber. These new rates do not apply to the sale of collectibles, certain real property gains (discussed below) and qualified small business stock on which there is a 50 percent gain exclusion.

Tier One

The first tier applies to capital gains realized from May 7, 1997 through July 28, 1997. During this time period, a long-term gain will result from the sale of a capital asset held for more than one year, just as under the old law. With respect to such sales, the top noncorporate rate has been reduced from 28 to 20 percent. The rate for those taxpayers currently paying at 15 percent has been lowered to 10 percent.

EXAMPLE *Mr. Smith inherited 500 acres of woodland on January 15, 1990. He sold timber from the tract twice in 1997—on February 18 and again on July 15. Mr. Smith's total income for 1997 will place him in the 31 percent tax bracket. The capital gains tax on each sale will be calculated as follows:*
a.) The February 18 sale will be taxed at 28 percent. A one year holding period applies, which was met by Mr. Smith. If he had waited to make this sale until after May 6, the rate would be 20 percent.
b.) The July 15 sale, since it was made after May 6, will be taxed at 20 percent—not 28 percent. Again, a one year holding period applies, which was met.

Tier Two

For sales made on July 29, 1997 through December 31, 2000, the new preferential rates apply only to capital assets held for more than 18 months. Gains during this time period from the sale of capital assets held for more than 12 months, but not more than 18 months, will continue to be taxed at either the 28 or the 15 percent rate, as before.

EXAMPLE *Mr. Jones purchased 100 acres of woodland on April 19, 1996. He sold timber from the tract three times during 1997—on February 28, July 25, and again on September 7, Mr. Jones' total income for 1997 will place him in the 36 percent tax bracket. The capital gains tax on each sale will be calculated as follows:*
a.) The February 28 sale will be taxed at 36 percent since it represents a short-term capital gain. The one year holding period was not met for long-term gain eligibility. If Mr. Jones had waited to make this sale after April 18, the gain would have been long-term and a lower tax rate (either 28 or 20 percent) would apply, depending on the sale date.
b.) The July 25 sale will be taxed at 20 percent since it was made after May 6 and before July 29. A one year holding period applies, which Mr. Jones met.
c.) The September 7 sale, since it was made after July 28, will be taxed at 28 percent. An 18-month holding period applies for the 20 percent rate and Mr. Jones did not meet this requirement. If he had waited to make this particular sale following 18 months of

ownership, or had made it at the same time as the second sale, the 20 percent rate would apply.

Tier Three
Effective in 2001, the 20 percent rate drops to 18 percent for capital assets acquired after 2000 and held for more than five years. Thus the holding period must begin after December 31, 2000.

As a result, the 18 percent rate is not available for gains realized before 2006. A similar reduction in the lowest rate, from 10 to 8 percent, will also apply after 2000 for gains related to more than five years. There is no requirement, however, that these assets be acquired after 2000. Therefore, starting in 2001, some gains may be taxed at only eight percent.

A taxpayer in the 20 percent capital gain rate bracket may elect to treat a qualifying capital asset, or property used in a trade or business, and acquired prior to January 1, 2001, as having been sold on that date for an amount equal to its fair market value on that date—thus resetting the acquisition date artificially.

Any "paper gain" resulting from the election is treated as received or accrued on January 1, 2001. Tax must be paid on it at that time at 20 percent, even though no sale actually occurred. Future appreciation from that date forward, however, will qualify for the 18 percent rate after a five-year holding period.

Woodland owners might want to make this election for certain timber which, as of January 1, 2001, hasn't yet appreciated substantially, so that only a small amount of gain is recognized at the time of the election. If the timber is expected to be held for at least five more years, future appreciation upon a sale would then be taxed at 18 percent instead of 20 percent. This situation is tailor-made for plantations established shortly prior to the year 2001 if the 18 month holding period has been met.

EXAMPLE *Mr. Brown purchased 200 acres of woodland on May 25, 1996. He sells timber from the tract on April 30, 1998 and again on June 15, 2001. In each of these years, Mr. Brown's total income places him in the 15 percent tax bracket. The capital gains tax on each sale will be calculated as follows:*
a.) The April 30, 1998 sale will be taxed at 10 percent. An 18 month holding period applies, which was met.
b.) The June 15, 2001 sale will be taxed at eight percent. On that date Mr. Brown had held the timber for more than five years and thus the sale qualified for the eight percent rate.

EXAMPLE *Mr. White purchased 200 acres of woodland on June 19, 1996. He sells timber from the tract on July 30, 1999; on September 21, 2001; and again on May 29, 2006. In each of these years, Mr. White's total income places him in the 31 percent tax bracket.*

The special election discussed above, if made, would only apply to the last sale because meeting a five year holding period is necessary after the election. Mr. White does not make the election. The sales will be taxed as follows:
a.) The capital gain from each of the three sales will be taxed at 20 percent.

EXAMPLE *In the preceding example, assume that Mr. White makes the special election discussed above for the timber included in the third sale. On Mr. White's tax return for 2001, the difference between the timber's basis and its fair market value on the election date will be taxed at 20 percent—even thought the timber was not sold or cut that year. Then, when the sale is actually made on May 29, 2006—more than five years after the election—the difference between the sale price and the fair market value on January 1, 2001 (minus sale expenses) will be taxed at 18 percent. If the election were not made, no tax would be due until the year of the actual sale and it would be paid entirely at the 20 percent rate.*

Depreciable Real Property Gains
That portion of the capital gain from the sale of depreciable real property that is attributable to prior depreciation deductions will not benefit from the new low rates discussed above. It will be taxed at a top rate of 25 percent rather than the maximum 20 percent rate that applies to most other capital assets.

Home Sales
Effective for transfers on or after May 7, 1997, taxpayers filing jointly can exclude from income up to $500,000 ($250,000 for a single taxpayer) in capital gain from the sale or exchange of their principal residence. This is a permanent exclusion, not just a deferred or rollover of gain until a later time.

Moreover, there is no reinvestment requirement. To qualify, a taxpayer must have owned and used the property as a principal residence for at least two of the five years preceding the sale or exchange. This exclusion may only be claimed once every two years.

Estate Tax Relief
Estate and gift taxes apply to both lifetime gifts and to transfers at death. Under prior law, each individual was entitled to a unified credit of $192,800 against estate and gift taxes, which effectively exempted the first $600,000 of taxable transfers from tax. Since the credit is available on an individual basis, under prior law a husband and wife could effectively transfer $1.2 million tax free.

Increase in Unified Credit
Effective for decedents dying and gifts made after 1997, the new law gradually increases the unified credit from the current effective exemption of $600,000 to an effective exception of $1 million by 2006. Thus, on a combined basis, after the increase is fully phased in, a husband and wife will be able to transfer up to $2 million of any type of assets tax free. The phase-in schedule is shown in Table 1 below.

Table 1: Estate Exemption Schedule

FOR DECEDENTS DYING AND GIFTS MADE IN:	EFFECTIVE EXEMPTION
1998	$625,000
1999	$650,000
2000-2001	$675,000
2002-2003	$700,000
2004	$850,000
2005	$950,000
2006 and after	$1,000,000

Closely Held And Family-Owned Businesses
A new estate tax exclusion, when combined with the unified credit discussed above, offers taxpayers the opportunity to exclude up to $1.3 million in value of closely-held family business interests from tax. It becomes effective in 1998. The $1.3 million in value, which will not be indexed for inflation, is arrived at after applicable discounts for lack of marketability, minority ownership, and special use valuation. These estate planning tools have all been discussed in previous issues of National Woodlands.

Because the $1.3 million exclusion includes the unified credit, the value of the additional exclusion above the unified credit will gradually decrease as the unified credit increases. With proper planning, however, a husband and wife will be able to transfer up to $2.6 million in value of family business assets tax free.

The new exclusion is only available for family businesses that meet certain requirements. The aggregate value of the decedent's qualified business interests that are passed to qualified heirs must exceed 50 percent of the decedent's adjusted gross estate.

This 50 percent test includes the value of lifetime gifts of business interests made by the decedent to family members.

The decedent or a family member must also have owned and materially participated in the business for at least five of the eight years preceding the date of death. Although many family-owned woodlands should be able to qualify, lifetime planning is essential to insure that all the requirements will be met.

One significant aspect of the new exclusion is that the cutting or selling of timber as an integral part of the business during the recapture period will not trigger a recapture tax. The existing special use valuation rules for standing timber, however, still prohibit cutting during there capture period.

Unfortunately, the law just passed was not amended to correct this inequity. The material participation requirements for timber owners with respect to the new exclusion are also more liberal than those associated with special use valuation.

Deferral and Extension Of Estate Tax Payments
Under current law, certain family owned businesses can defer payment of the estate tax for up to five years and then pay it in ten annual installments. Many timber ownerships have taken advantage of this provision.

The interest rate currently is four per cent on the deferred tax attributable to the first $400,000 of taxable value, and equal to the rate applied by the IRS to tax underpayments for tax attributable to amounts over $400,000.

The new law provides that the interest rates effective for the estates of decedents dying after December 31, 1997 will be significantly reduced.

A two percent rate will be levied on the deferred tax attributable first $1 million of taxable value. This $1 million thresh-

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old will be indexed for inflation after 1998. The rate applicable to taxable values over the initial threshold will be only 45 percent of the rate applied to tax under payments.

Other Estate and Gift Tax Provisions
The new law makes numerous other changes in the estate and gift tax area. Some are substantive; others fall under the category of simplification.

Conservation Easements
Taxpayers currently can elect to deduct, for estate and gift tax purposes, the value of a qualified real property interest donated to a qualified organization exclusively for conservation purposes. Effective for estates of decedents dying after 1997, the new law provides that an executor can also elect to exclude 40 percent of the value of any real property subject to a qualified conservation easement, up to a maximum exclusion of $100,000 in 1998.

This exclusion amount, which will be gradually increased to $500 ,000 by 2002, is based on the value of the property with the conservation easement in place and is in addition to the increased unified credit and new family business exclusion discussed above.

This provision will be of limited use to woodland owners, however, because of the severe restrictions associated with it. The land must be located within 25 miles of a metropolitan area, or a national park, or a wilderness area, or within ten miles of an urban national forest. In addition, it must have been owned by the decedent or a member of the decedent's family at all times during the three-year period ending on the date of the decedent's death.

Adjustments for Inflation
Prior to the new law, estate and gift tax threshold amounts were not indexed for inflation. Effective for gifts made and decedents dying after 1998, however, certain dollar thresholds will be indexed. They include the annual $10,000 gift tax exclusion; the $750,000 maximum value reduction for special use valuation; and the $1 million generation-skipping tax exemption.

Work Yet To Be Done
Unfortunately, the 1997 Tax Act failed to address several items of direct concern for woodland owners. No changes were made in the onerous income tax passive loss rules, which prevent many timber owners from fully deducting their management expenses.

Nor was the ceiling of $10,000 for the income tax reforestation amortization and credit provisions raised. This dollar limit has been in effect the entire 17 years since the law was enacted, with no increase or indexation for inflation—despite significant increases in planting and site preparation costs over the years.

In the estate tax area, no change was made in the complex rules for special use valuation, many of which have little applicability to the realities of woodland ownership but which still must be followed as best the executor can. In the interest of equity and fairness to woodland owners, the forestry community should continue to press for changes in these particular areas of the tax law.

Conclusion
The lowering of the noncorporate capital gains tax rates is probably the most significant change in the new tax law for most woodland owners, followed closely by the estate tax relief provisions. Proper planning, however, will be essential—and more critical than previously—in order to insure that the requirements for the new benefits are met and their election not denied upon audit by the IRS. Qualifying will not be automatic.

Timber owners in the lower income tax brackets who were perhaps not greatly concerned previously with qualifying their timber sales for capital gain status now have good reason to be concerned. From an estate and gift tax standpoint, a woodland must be structured as a business to qualify for the new $1.3 million exclusion. This rule also has income tax implications from a capital gain standpoint.

All woodland owners should make an effort to understand the basic provisions of the new law that apply to their personal situation . Not doing so could result in paying thousands of unnecessary dollars to Uncle Sam. I will be discussing the individual aspects of the new law in greater detail in future issues.

William C. Siegel is an attorney in private practice specializing in timber tax law and forestry estate planning. He recently retired as Project Leader for Forest Resource Law and Economics Research with the Southern Forest Experiment Station, USDA Forest Service. He provides this column as a regular service to *National Woodlands* readers. Mr. Siegel

welcomes comments and questions. They may be directed to him at: 9110 Hermitage Place, River Ridge, LA 70123; tel. (504) 737-0583.

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TIM'S TIPS

SAFE OPERATING TECHNIQUES FOR CHAIN SAW OPERATORS

BY TIM ARD

What method do you use to start your chain saw? There are numerous ways to start a chain saw safely and still be in control of it when engine fires. Many loggers and homeowners use what is commonly known as the "drop start". This method involves holding the saw with the left hand mid-distance between the chest and waist, and then rapidly "dropping" (pushing in a downward motion) the left hand and the saw while pulling the starter rope with the right hand. Another version of the drop start involves holding the saw by the rear handle with the left hand near chest height and then "throwing the left hand and arm out away from the body while pulling the starter rope with the right hand. Both of these methods are dangerous and should not be used. OSHA considers the drop start a serious safety violation for professional logging crews who use this technique.

To start a chain saw safely, you should always have two points of contact with the saw, and the right hand on the starter rope is NOT considered a point of contact. A hand on the starter rope does not give the operator any control over the saw.

Occasionally, I will see professional loggers and weekend wood cutters start their saw by resting the saw's bar across a log, grabbing the rear handle with the left hand and then pulling the starter rope. While technically this qualifies as two points of contact and is an OHSA-approved starting method, I do not recommend it because there is great likelihood of loss of control or injury if the chain brake is not engaged when the saw starts up. With the bar and chain resting on the log and the chain brake disengaged, the chain could spin if the engine revs pulling the saw out of your hand or throwing it back at you if the bar tip should contact an object in the kickback zone.

The two methods I recommend are starting the saw on the ground or using the "clamp start" technique. If you start the saw on the ground, make sure the area around the bar and chain is clear of any sticks, brush, or debris. Check the chain brake to make sure it is engaged (on). Occasionally the saw will rev up upon starting, and if you should happen to start the saw with the chain brake disengaged (off) and the saw's turning chain comes in contact with brush or debris while it's on the ground, it's likely to throw this debris back at you or violent kickback may occur if the rotating chain comes in contact with the debris in the kickback zone of the bar (see "Chain Saw's Reactive Forces" in *Illinois Forest Management Newsletter*, Volume 2, No. 31, 1996).

With the chain brake engaged, kneel down and firmly grip the front handle of the saw with your left hand. Put your left knee on the ground and your right foot inside the saw's rear handle or your right knee on top of the rear handle. This gives you two points of secure contact with the saw. Pull the starter rope to start the saw.

All too often I see "occasional" chain saw users and some loggers who use the ground starting technique with the proper two points of contact, but rather than kneeling down beside the saw, they simply bend over at the waist and begin pulling the starter rope. This can cause all kinds of back muscle problems for people who are not conditioned to this type of activity. Do your back a favor and kneel down beside the saw and let your arm muscles do the work of starting the saw rather than your back.

The saw starting technique I highly recommend is the "clamp start". The clamp start is simple to use. Make sure the chain brake is engaged. In a standing position, hold the saw firmly by the front handle with the left hand. Separate your legs slightly and place the saw's rear handle behind your right knee and let the bottom of the saw rest against your left leg.

Before pulling the starter rope, check to make sure the area around the saw's bar and chain are clear. Fully extend your left arm and lock it in place and pull the starter rope. That's all there is to it...it's simple and puts far less stress on your back muscles! When people see the clamp start demonstrated, they frequently remember "crotch start", which can hurt! Make sure the rear handle is behind your right knee!

See the photos (at right) for an idea of how the clamp start is performed. Watch for more tips on safe chain saw use in future issues of *Illinois Forest Management Newsletter*.

Safe sawing!

Tim Ard is a nationally-know chain saw safety and timber harvesting instructor and president of Forest Applications Training, Inc.. Mr. Ard is the instructor for Illinois' Pro Logger Training Program, a 5-day safety and productivity training program for professional loggers.

Pull the starter rope with the right hand.

With the chain brake ON, clamp the rear handle of the saw behind your right knee and rest the bottom of the saw on your left leg.

Announcing forestry's answer to MARCH MADNESS— a terrific conference for forest landowners!

The **1998 Tri-State Forest Stewardship Conference** will be held on Saturday, March 28 at the Sinsinawa Conference Center in Sinsinawa, Wisconsin. The conference includes 26 different programs (see list of programs below and right). The cost is $25.00 per person or $40.00 for two people, and includes a continental breakfast and luncheon. For a copy of the conference registration brochure, please contact Judy Stoll @ 217-333-3650. The registration deadline is March 11, 1998. No walk-in registrations will be permitted the day of the conference.

Program Highlights:

"What Can a Consulting Forester Do For You and How to Locate and Hire One"; "Woodland Wildflower Identification"; "Timber Stand Improvement—What Is It, How Do I Know I Need It, And How Do I Do It?" **(includes a discussion of appropriate herbicides)**; *"Wildlife Inventorying and Monitoring / What Wildlife Do You Have?"; "Interpreting Your Forest's Health"; "Tree Planting Basics"; "Winter Tree Identification"; "Raptors of the Tri-State Region"* **(includes live birds)**; *"Prescribed Fire—Its Use as a Tool in Forest Management"; "Selecting and Using Herbicides When Tree Planting"; "Deer and Your Woods—Impacts and Management"; "Tree Identification for Beginners"; "Woodland Wildflower Seed Collection and Propagation"; "Establishing Trees by Direct Seeding"; "Tips on Marketing Your Timber"; "An Introduction to Silviculture and Forest Ecology"; "Processing and Using Native Hardwoods"; "Basic Mechanics of Directional Felling and Chain Saw Use "; "Reptiles and Amphibians on Your Land—Their Needs and Management"; "Recordkeeping for Forest Landowners"; "Small Scale/ Hobby Maple Syrup Production"; "Forest Regeneration Systems—What, When, Where, and How"; "Applying Crop Tree Management on Your Property"; "Direct Seeding—A Landowner's Experience"; "Making Maple Candy and Other Maple Confections"; "Regenerating Oak: A Challenging Task—What Do We Know?"*

ILLINOIS TIMBER PRICES

ILLINOIS AGRICULTURAL STATISTICS SERVICE
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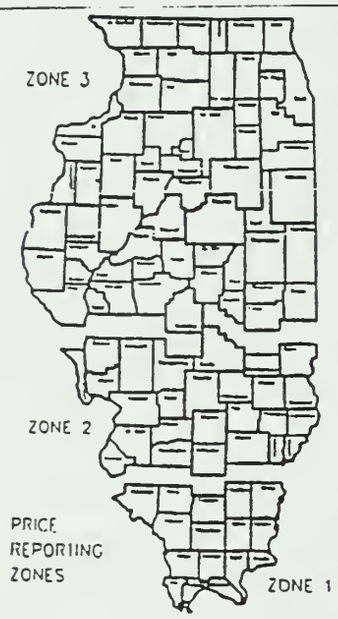
ILLINOIS DEPARTMENT OF NATURAL RESOURCES

December 9, 1997



PRICES PAID ILLINOIS TIMBER PRODUCERS
MAY 1997 THROUGH AUGUST 1997

Summer sawtimber prices paid to Illinois timber growers generally showed slight upward trends for F.O.B. Mill and stumpage compared to both the previous summer and winter. Of the timber buyers reporting volume of their 1997 operations, 37% indicated their volume was 500 thousand board feet or more.

This report is prepared by the Illinois Agricultural Statistics Service in cooperation with the Illinois Division of Forest Resources. Unless otherwise indicated, prices shown in this report are prices reported by licensed timber buyers. The cooperation of those timber buyers who participated in the survey is greatly appreciated.

Illinois is divided into three price-reporting zones, based on timber resources, similarity, utilization standards and practices and soil types. Zone 1 is the Southern Unit; Zone 2, the Claypan Unit; and Zone 3, the Prairie Unit. Ranges of prices for each zone are shown on the back of this report.

This report can be used only as a general guide for determining market value of timber. General market and economic conditions are the major price-determining factors. Certain local considerations such as accessibility, site and terrain, distance to market, size of sale, and tree size and quality also affect the price paid. For technical, marketing or management assistance, contact your local State Forester, or the Division of Forest Resources, Illinois Department of Natural Resources, 600 North Grand Avenue, West, Springfield, Illinois 62706.

AVERAGE PRICES FOR STUMPAGE AND F.O.B. IN SELECTED PERIODS

SAWTIMBER - $ PER M BD. FT.

SPECIES	May 1996-August 1996		November 1996 - February 1997		May 1997 - August 1997	
	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
Ash	170	340	170	300	150	320
Basswood	100	230	95	190	100	220
Beech	80	180	70	180	75	180
Cottonwood	50	150	40	140	60	150
Sweet Gum	85	170	85	170	75	180
Elm & Hackberry	60	150	60	140	75	170
Hickory	80	160	65	170	85	190
Soft Maple	95	210	95	170	95	220
Sugar Maple	120	190	140	300	140	300
Black Oak	160	270	150	250	160	300
Pin Oak	65	160	60	160	80	180
Red Oak	230	390	220	385	240	410
White Oak	220	390	200	340	220	380
Yellow Poplar	120	350	120	280	120	290
Sycamore	70	150	60	160	65	170
Black Walnut	320	510	330	510	340	510
Woods Run Bottomland	85	180	80	180	90	200
Woods Run Upland	110	300	140	270	130	270

FACE VENEER - $ PER M BD. FT.

Red Oak	600	950	510	730	620	990
White Oak	1,000	1,800	1,100	1,900	1,000	1,800
Walnut	1,600	2,000	1,490	2,100	1,500	2,300

COOPERAGE - $ PER M BD. FT.

White Oak	280	600	250	430	250	420

UNPEELED PULPWOOD - $ PER TON

Ton	1.50	16.80	2.10	17.25	2.00	17.00

Timber Prices
May 1997-August 1997
December 9, 1997

MOST COMMONLY REPORTED PRICES PAID ILLINOIS TIMBER PRODUCERS
May 1997 - August 1997

PRODUCT	UNIT	Zone 1		Zone 2		Zone 3	
		Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill	Stumpage	F.O.B. Mill
1. Sawtimber				Dollars			
Ash	M bd. ft.	90 - 200	200 - 400	100 - 250	200 - 400	100 - 210	200 - 450
Basswood	M bd. ft.	80 - 100	180 - 250	70 - 120	200 - 250	60 - 120	170 - 270
Beech	M bd. ft.	50 - 100	150 - 200	60 - 80	150 - 200	60 - 100	150 - 200
Cottonwood	M bd. ft.	30 - 90	140 - 170	40 - 100	140 - 200	20 - 100	120 - 170
Sweet Gum	M bd. ft.	50 - 130	150 - 200	50 - 100	150 - 190	50 - 100	150 - 200
Elm & Hackberry	M bd. ft.	50 - 100	150 - 180	50 - 100	150 - 190	30 - 120	150 - 200
Hickory	M bd. ft.	70 - 100	150 - 200	50 - 100	150 - 210	50 - 100	150 - 250
Soft Maple	M bd. ft.	60 - 120	150 - 250	60 - 120	150 - 270	60 - 140	150 - 270
Sugar Maple	M bd. ft.	60 - 200	150 - 400	70 - 200	150 - 400	80 - 200	200 - 400
Black Oak	M bd. ft.	80 - 200	200 - 400	80 - 250	200 - 400	90 - 200	200 - 350
Pin Oak	M bd. ft.	50 - 100	150 - 200	40 - 100	150 - 200	40 - 100	140 - 210
Red Oak	M bd. ft.	100 - 320	350 - 550	100 - 300	300 - 500	150 - 300	300 - 450
White Oak	M bd. ft.	150 - 300	300 - 500	150 - 300	250 - 500	150 - 300	250 - 450
Yellow Poplar	M bd. ft.	100 - 200	250 - 300	70 - 150	230 - 320	80 - 150	250 - 300
Sycamore	M bd. ft.	30 - 90	130 - 200	45 - 100	150 - 200	35 - 80	140 - 200
Black Walnut	M bd. ft.	200 - 400	400 - 600	180 - 400	400 - 600	200 - 400	400 - 630
Woods Run Bottomland	M bd. ft.	60 - 100	170 - 220	45 - 140	150 - 200	40 - 100	170 - 230
Woods Run Upland	M bd. ft.	100 - 150	180 - 300	60 - 170	150 - 350	100 - 150	200 - 350

		STATEWIDE	
		Stumpage	F.O.B. Mill
2. Face Veneer			
Red Oak	M bd. ft.	400 - 800	700 - 1,500
White Oak	M bd. ft.	500 - 1,700	1,600 - 2,500
Walnut	M bd. ft.	1,000 - 2,000	1,400 - 3,500
3. Cooperage			
White Oak	M bd. ft.	150 - 350	400 - 450
4. Pulpwood			
Unpeeled	Ton	1.80 - 3.00	16.00 - 18.00

LOG SCALES USED BY REPORTING BUYERS

Scale	Percent Using
Doyle	99
Scribner	1
International	0

CUSTOM SAWING BY THOSE REPORTING

Region	Percent Reporting	Rates Reported $/M bd. ft.
Zone 1	20	100 - 150
Zone 2	14	100 - 200
Zone 3	13	100 - 200
ILLINOIS	47	100 - 200

VOLUME OF 1997 OPERATIONS

Size in (000) bd. ft.	Zone 1 %	Zone 2 %	Zone 3 %	All %
1 - 100	22	21	52	32
100 - 500	36	34	24	31
500 - 1,000	7	4	5	5
1,000 - 3,000	21	33	14	24
3,000 +	14	8	5	8

Cooperage is the manufacture of barrels. Face veneer is logs cut into thin sheets or "veneer" used mostly by furniture builders. Pulpwood is used in making paper, fiberboard, and similar products. M bd. ft. means thousand board feet. Sawtimber refers to logs that are cut into lumber or timbers. F.O.B. refers to the price paid for timber delivered to the mill.

MARKED TIMBER SALES - MAY 1997 - AUGUST 1997

	STATEWIDE STUMPAGE*
Woods Run Upland	$199-$278/M bd. ft.
Woods Run Bottomland	Insufficient Data

*Prices supplied to District Foresters by seller, may include some veneer.

Jerry Clampet, State Statistician
Steve Peterson, Garry D. Kepley, Agricultural Statisticians

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